

# THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—38TH YEAR.

SYDNEY, SATURDAY, APRIL 28, 1951.

No. 17.

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### An Address.<sup>1</sup>

By STUART G. GIBSON,

*Retiring President of the Tasmanian Branch of the British Medical Association.*

THE President of the Branch has a multiplicity and a great variety of duties to perform during his tenure of office. Some of them are pleasant, some are not so pleasing, but I think the most arduous of them all is the duty that devolves upon him of delivering an address at the close of his year of office. Fortunately I am not aware that there are any hard and fast rules governing the type of subject matter, and so today I propose that you will bear patiently with me, and as forbearingly as you can, while I delve a little into the past and draw a few comparisons between the practice of our profession as it is now in Tasmania and what it was like a generation or two ago. Past events are not only of interest to us, but, as so notable a person as Winston Churchill has said, we should profit by them. When we are prone to bewail our lot, it does us no harm to compare our status today with that of our forebears. It may enable us to realize how much better off we are in many ways, and to make our arduous life seem, by comparison, to be a little less arduous.

The British Medical Association was founded in 1832, but there was no Tasmanian Branch until much later than that. The first beginnings of anything comparable with the British Medical Association was the formation of a Medical Section of the Royal Society of Tasmania in the year 1897—fifty-four years ago. The first president of this

Medical Section was the late Dr. Bright, and there were two vice-presidents—the late Dr. E. L. Crowther, father of our own present Dr. W. E. L. Crowther, and the late Dr. Gam Butler, father of our well-known Dr. Harry Butler. The first honorary secretary was the late Dr. Gregory Sprott, who was for so long a member of the British Medical Association and our Federal representative for many years. These names are taken from the original minutes in possession of the Royal Society of Tasmania, and I can vouch for their accuracy only in so far as I am able to read their signatures. Unfortunately the original members all signed their names in the appropriate column, and I fear that the signatures of medical men of that time were just as indecipherable as those of the present day. There is, I believe, only one of the original members of the Medical Section of the Royal Society left—Dr. Wilfred Giblin, who is, I am glad to say, still actively practising his profession.

The actual formation of the Tasmanian Branch of the British Medical Association did not come about until 1911. This was a great step forward in our history. I need not stress to you the many advantages that accrue to us from the British Medical Association. I feel sure that it is largely due to our Association and its codes of behaviour, its ethical rules and its other high ideals that most of us are enabled to live and work with the greatest of peace and friendship amongst ourselves. I might add, in parenthesis, that I do not refer to political controversies, but to our ordinary day-to-day contact with one another. We in Tasmania manage to rub along with our fellow practitioners with great ease. Seldom, if ever, do you hear of hard words and fights between us. But this happy state of affairs was not always so. Before the days of medical societies and the British Medical Association it was quite customary for medical men of this town—as it was then—to carry on an extremely acrimonious battle with one another through the medium of the local Press.

<sup>1</sup>Delivered at the annual meeting of the Tasmanian Branch of the British Medical Association on February 10, 1951.

And I can assure you that the local Press in those days was, to put it kindly, very outspoken and no respecter of persons. For instance, in the *Hobart Town Courier* of February 2, 1841, and for several subsequent issues, there appeared a very voluminous correspondence between Dr. F. G. Brock, the Colonial Assistant Surgeon, and Dr. E. S. P. Bedford, a private practitioner. The dispute arose over the question of who was to amputate the leg of one Sparks, who was an inmate of the Colonial Hospital, but who evidently repented of his decision to have it done by Dr. Brock, who was in charge of the Colonial Hospital. Sparks preferred that Dr. Bedford should do the deed. After some skirmishing on both sides Sparks was removed from the Colonial Hospital to The Self-Supporting or Saint Mary's Hospital, situated in Campbell Street near to the Theatre Royal. The building is there still, not as a hospital, but as a boarding house. Thereupon Dr. Brock issued an ultimatum to Dr. Bedford that he either sign a document that he acknowledged that his conduct in the matter had been a violation of the professional observances which ought to exist among medical gentlemen and for which he expressed regret, or else he fight a duel. Dr. Bedford, very wisely I think, declined to do either of these things.

Fortunately times have changed in the methods of settling disputes between ourselves, and we need, thanks to our organization, no longer fear that we will have to defend ourselves in the public Press from our professional brethren. I wonder what would be the reaction of our ethics committee today if they were called upon to provide seconds for a couple of duelling doctors who had some slight disagreement about the propriety of their behaviour.

Another thing I think we ought to appreciate and to be thankful for is that we carry out our work now in much greater physical comfort than did our predecessors, even within my own recollection. I can remember that when I was a child, reared in a doctor's house, there were no such things as motor-cars. Punctually at ten in the morning and again at three in the afternoon the doctors' carriages would be driven to their respective doors by their respective grooms. Soon afterwards the owners of the carriages would step out of their houses, in the correct professional attire—top hats, morning coats and stiffly starched shirts and collars, with the mon-aural stethoscope either tucked away in the top hat or else reposing in the capacious pocket situated in the tail of the coat—and away they would go on their rounds at the frightening speed of eight or even ten miles per hour. It took a long time to do a big round at that speed. And incidentally, grooms were grooms in those days, and a lot more besides. Our groom, in addition to looking after all the horses, and we had at least four always in the stables, used to sweep the garden paths and clean all the family footwear, which was no mean task for a family of nine children. He became the family groom some two or three years before I was born, and he was still washing and polishing my car for a good many years after I started practice in Hobart. Times have unfortunately changed, and service of that calibre is a thing of the past.

But time marched on, and ere long the late Dr. Arthur Clarke, who was for a long time city health officer, and who lived for many years in the house I live in now, imported the first motor-car, an intriguing thing of one cylinder, steered with a handle like a bath chair and with an outsize in bicycle bells on the handle. They were an uncertain quantity were those first motor cars. The only certain thing about them was their ability to scare all the horses into a panic. The driver of a horse-drawn vehicle, at the first sight or sound of a car, would leap from his carriage and grab the bridle, and by soothing words would try to persuade his startled steed that what he saw approaching was in truth quite harmless. It took a long time for horses to learn to ignore cars. It also took considerable forbearance on the part of carriage owners to remain polite to car owners.

Nowadays we drive round in luxurious heated cars unaffected by weather conditions. Fifty years ago our predecessors drove about in buggies or phaetons or dog-carts, which were not very comfortable in wet weather. A buggy certainly had a hood, which kept some of the rain

off. It also had a waterproof rug that came from the feet up to about the level of the thyroid, over which you peered with a streaming face while the water gradually got down below the level of the clavicle.

Necessity being the mother of invention, heating arrangements were even then not unknown. A large demijohn served the purpose, not by the drinking of the contents, but by its being filled up with boiling water and surrounded with straw. On a long night journey in the depth of winter this contraption kept warm for a long time, and long winter journeys, which were fairly frequent, were thereby made more bearable.

In those days there were practically no doctors in the country districts. Nowadays you and I could make a trip to, say, Bothwell, and be back in a few hours. At that time, at eight miles per hour, it was a matter of two days, Bothwell being 47 miles from Hobart. I should imagine that a journey of that nature would be hard to bear.

Nor was life entirely free from risk. I remember my father telling me that soon after he began to practise in Hobart about 1887 he had a horse killed under him. It was a black, wet, winter's night, and rather than rouse out the groom and a carriage, he saddled a horse and rode out Elizabeth Street to New Town. A horse and dray were coming in the opposite direction, the driver's head being down into the rain and wind, and his overcoat blown back over the one and only carriage lamp, so that neither could see the other. One of the shafts of the dray was driven for over a foot into my father's horse and killed it on the spot. I presume he walked after that, since he could not telephone for a taxi.

I think it would be a reasonable assumption on my part to say that if our present-day medical students knew that they were destined to undergo the hardships of practice as it was fifty years ago, our medical schools would not be nearly so well patronized as they are now.

And now I have done. Let my closing words deal not with the distant past, but only with the past year. I would offer you my profound thanks for the honour you did me in electing me to be your President, and on both your behalf and mine I would tender sincere gratitude to the Council and to the Secretary, not only for the great amount of work that they have accomplished, but also for their unfailing and unstinted help to me.

### NASAL PLASTIC SURGERY.<sup>1</sup>

By A. B. K. WATKINS, M.S. (London),  
F.R.C.S. (England),  
Newcastle, New South Wales.

THIS paper is being read by an oto-rhino-laryngologist who has regularly given a proportion of his time to plastic surgery on parts embraced by his specialty. Given, as it is, at an oto-rhino-laryngological meeting, it is intended primarily to interest oto-rhino-laryngologists. Therefore, if it appears somewhat routine to any visiting plastic surgeons, I crave their indulgence. Owing to time limitations, I propose to concentrate chiefly on points of practical value that I have found helpful.

There are few of us who have no experience of plastic surgery, for we have all at least treated fractures of the nose with displacement. Let us therefore consider this subject first.

#### Fractured Nasal Bones.

The most important part in treatment is the education of the casualty surgeons, who are inclined to be lax in diagnosis and tardy in the institution of treatment. They are inclined to send people with crooked injured noses away for X-ray examination at the optimum time for

<sup>1</sup> Read at a meeting of the Section of Oto-Rhino-Laryngology, Australasian Medical Congress (British Medical Association), Seventh Session, Brisbane, May-June, 1950.

treatment, which, provided the patient's general condition allows it, is on the very day when the accident occurs.

Though I do not want to depreciate their wish to have such patients radiologically examined, I do deplore the fact that so often they fail to reason that if a nose was straight before an injury and it is crooked afterwards there is a

to rotate the nasal bone on the side of the blow first, and the surgeon is always well advised to avoid an ego-shaking error by first asking the patient whether his nose was quite straight before the recent injury.

Provided treatment is undertaken early, there is usually no tendency to recurrence; but if any is noticed within



FIGURE I.

The late result of an untreated common type of nasal fracture. Both nasal bones are rotated to the left around an axis parallel with the nasal bridge.

nasal fracture with displacement. Even if an X-ray picture shows a fracture, it requires no treatment provided there is no displacement.

Though much literature exists on the types of nasal fracture, I reiterate what I have emphasized for seventeen years—namely, that one needs to take special notice only

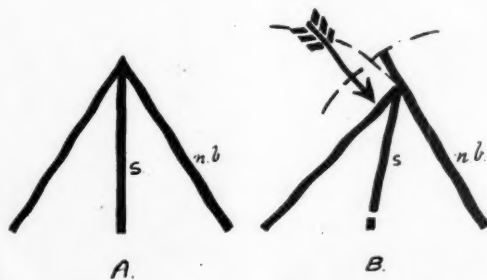
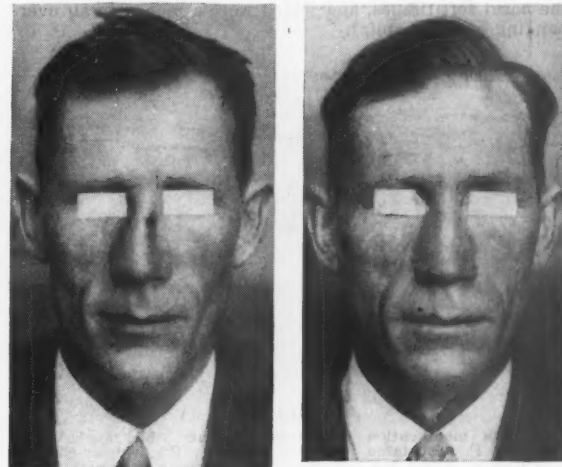


FIGURE II.

A schematic illustration of the common type of nasal fracture, A before and B after displacement; s, nasal septum, n.b., nasal bones.

of two. The first is what I term the common fracture. It is caused by a blow on the side of the nasal bridge, which fractures both nasal bones and causes them both to rotate in the same direction about an axis parallel with the axis of the bridge of the nose (Figures I and II).

Treatment is easy, consisting of rotating both bones with Asch's forceps. To prevent locking it is important



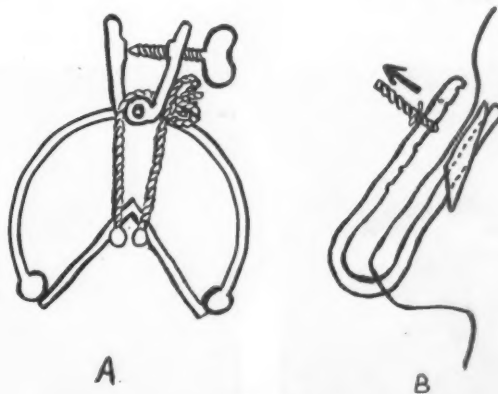
A

FIGURE III.

B

Common type of nasal fracture; A before and B after treatment.

a few minutes of reposition, splinting should be resorted to (Figure III). Once I experimented with spring and elastic pressure splints, but finally decided they should not even be considered for this class of work. I advise a light plaster of Paris splint made of several layers of best-class proprietary plaster bandage.



A

FIGURE IV.

B

A: Carter's splint with traction threads perforating nose; B: principle of Watkins's modification, in which the same result is attained without such perforation.

When the time comes, a few days later, to remove the splint, it is a good practice to make the patient take it off an hour or two before the consultation, so that one may detect any tendency to recurrence and replace the splint. Any such late recurrence requires prolonged splinting; but it is comparatively rare, if any early tendency at the original operation has been dealt with by freely displacing the bones, rotating them from side to side several times.



The other important fracture to which I referred is relatively uncommon. It is the comminuted fracture with depression of the nasal bridge. Often it is associated with severe facial injuries.

Once this deformity was best dealt with by Carter's splint (Figure IV A). Carter placed straight splints far forward in both nasal fossae and pulled them anteriorly by silk threads attached to their centres, which perforated the nasal soft tissues, and which were attached to an overhanging external splint.

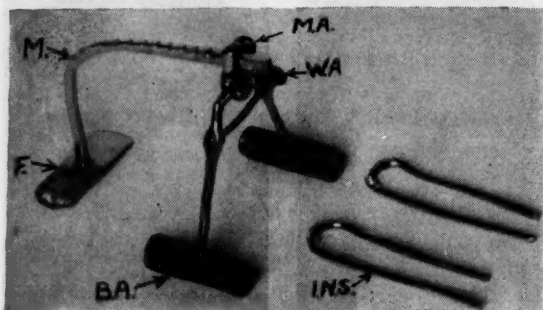


FIGURE V.

Watkins's modification of Carter's splint. M, mast with notches; F, adjustable footpiece of mast; BA, rubber-coated footpiece of arch; MA, screw to adjust length of mast; WA, screw to adjust width of spread of arch; INS, intranasal U-shaped splints.

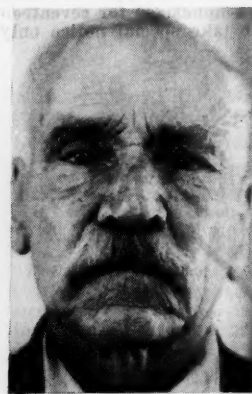
Because of the risks of skin scarring, fistula or perichondritis, I devised my splint (Figures IV B and V). The idea is the same as Carter's, except that perforation of the soft tissues is rendered unnecessary by the use of U-shaped splints, one arm of which is inserted in the nasal fossa, the other being used for traction. The whole splint is so adjustable that, whatever the size of the patient or the asymmetry of the face, the splint can be adjusted to avoid pressure on almost any other facial injuries which may exist.



A



B



C



D

FIGURE VI. A and B, rhinophyma before treatment; C and D, rhinophyma after treatment.

The use of this splint has undeservedly been given up by some surgeons, chiefly because they have not bothered to appreciate that the silk traction threads must be adjusted at right angles to the nasal splint to prevent "creeping". I would remind others that this splint was never intended for the treatment of what I have already described as the common nasal fracture.

### Rhinophyma.

Having disposed of nasal fractures, I will consider the next step on the ladder of those aspiring to nasal plastic surgery—namely, dealing with rhinophyma.

It is fortunate for us that this tumour-like hypertrophy of the nasal skin combines such a horror-striking appearance with a condition so easily treated.

All one has to do is to carve the excess tissue away in successive slices with a sharp scalpel or razor. The only difficulty is that hæmorrhage is frequently most embarrassing. Even pressure, hot packs and adrenaline may fail to control it. In several of my cases I had to resort to sprinkling on powdered alum to control the severe bleeding (Figure VI, A, B, C and D).

Skin grafting is fortunately unnecessary, as such numerous skin remnants in the form of sebaceous and sweat glands exist that regeneration of epithelium is dramatically prompt. Those few surgeons who have advocated the use of split-thickness skin grafts here, have, I believe, deceived themselves, for one would certainly be unable to cause such a graft to "take" in the face of such severe hæmorrhage; and if one did, healing could scarcely be more rapid than if it had been omitted. Strangely enough, recurrence is most unusual. Of the number of patients whom I have been fortunate enough to treat, I remember only one with any such tendency, and his recurrence was so slight as to require no further treatment.

### Chronic Crooked Nose.

Though one usually associates chronic crooked nose with bony deformity, the association is not invariable. From time to time one sees patients whose deflections of the nose commence below the inferior edge of the nasal bones. It is important to remember that such a condition exists, as at first glance it looks very like the usual type of deformity (Figure VII, A and B). In the case illustrated, all that was required to straighten the nose was resection of the septum.

When the deformity is due to neglected or late treatment of the common rotation fracture, Joseph's or Fröhwald's operation is the one usually advised (Figure VIII). After the skin of the nose has been undermined in a manner referred to later, the bony nasal bridge is freed as a whole by lateral saw cuts. A second saw cut on the side of the

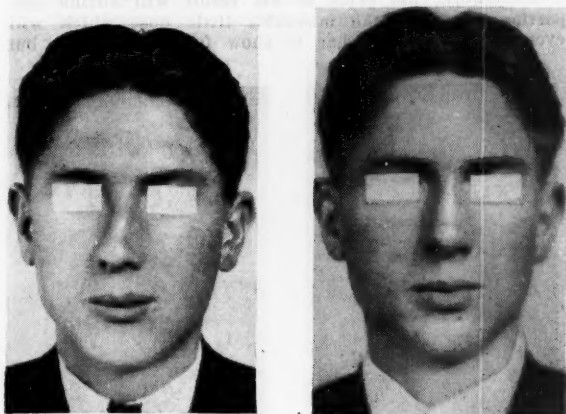
original injury loosens a triangle of bone, which is removed, the bridge being allowed to move over to the mid-line.

In performing such an operation, do not use the saws with the ridiculously tiny teeth originally advocated by the masters of the method. Work is infinitely easier with the modern substitutes.



What impresses me chiefly with this operation is its extreme ingenuity; but though I achieved success with it I also met with disappointments, due to the difficulty in

have also for some years taken the advice of Boyd Law, of Lismore, who uses refrigerated septal cartilage killed in weak "Merthiolate" and saline solution. In a small series,



A

FIGURE VII.

B

An unusual type of deflected nose due to a deflected septum; A, before resection of the septum; B, after resection of the septum.

estimating the exact amount to excise, and to the tendency for the bridge to move back fairly late in convalescence.

Years ago, I devised instead a simpler and less spectacular method, which in my hands has produced quicker and more certain results (Figure IX). All I do is to mobilize the displaced bones by lateral saw cuts and by a near-median cut, which separate the nasal bones from

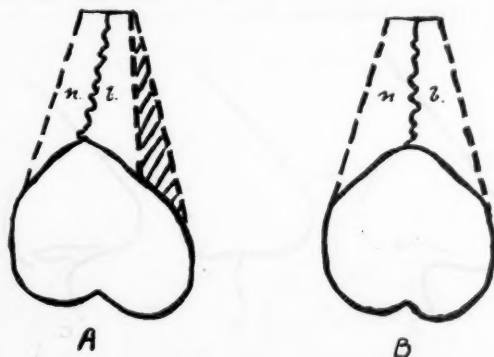


FIGURE VIII.

Diagram of Joseph-Frühwald operation for chronic crooked nose: n.b., nasal bones; dotted lines show site of saw cuts; shaded area, bone to be removed to allow deformity A to be corrected as at B.

their anterior attachment to one another. Then one rotates the bones and treats the condition as one of recent fracture.

#### Depressed Nasal Bridge.

The treatment of depressed nasal bridge is also a fairly simple form of plastic surgery, well within the scope of routine oto-rhino-laryngology.

A depression of the lower part of the bridge alone is due to lack of septal cartilaginous support (Figure X). Provided that the columella is not also lacking in cartilage, a small insert will remedy the defect. Though I have chiefly used autotransplanted rib grafts for this purpose, I

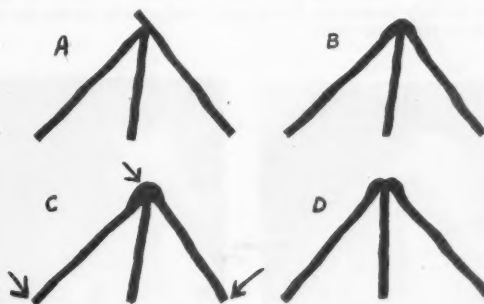


FIGURE IX.

A, septum and nasal bones after common type of nasal fracture; B, common type of fracture, united; C, arrows show sites of saw cuts for correction by Watkins's method; D, correction.

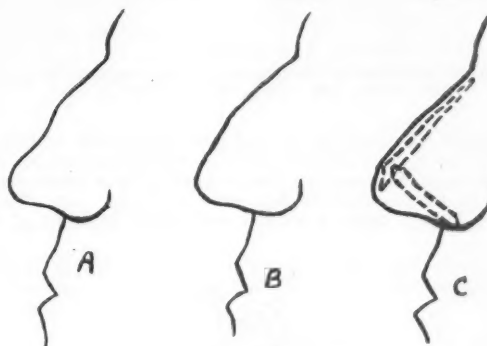


FIGURE X.

A, type of depression caused by collapse of cartilaginous septum; B, deformity produced by short dorsal implant without introduction of columellar support; C, proper correction with dorsal and columellar inserts.

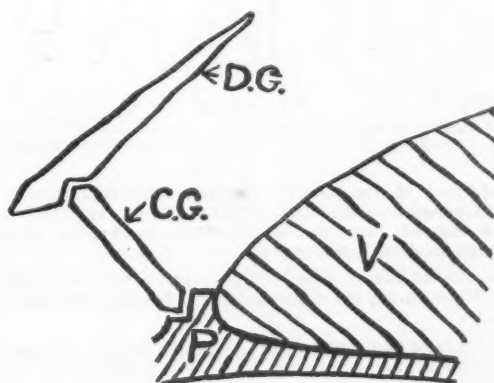


FIGURE XI.

A simple form of fixation for columellar grafts. The sharpened ends of the graft (CG) are inserted into excavations made in the dorsal graft (DG) and the maxillary spur. P, palate; V, vomer.

results have been uniformly satisfactory with this dead cartilage. On a recent trip abroad I found that it is becoming accepted that even bovine cartilage, provided it has been killed first, is well tolerated by human beings.

When the columella also has collapsed it must be dealt with, or any insert in the nasal bridge will make an ugly hump at its upper end.



A

B

FIGURE XII.

A patient with loss of cartilaginous septal support; B, patient with dorsal and columellar cartilage inserts.

Instead of using the hinged periosteal graft of Gillies, which has a disconcerting habit of separating into its two components, I insert the bridge graft with a countersunk hole on its posterior surface near the lower end (Figure XI). Then I make a similar depression in front of the

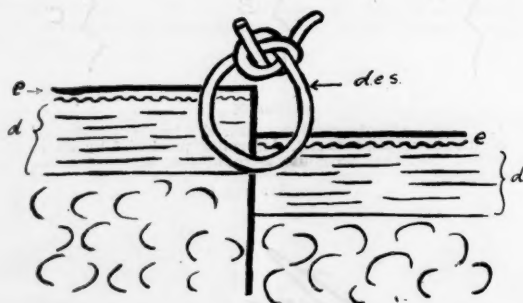


FIGURE XIII.

Watkins's dermo-epidermal suture to produce skin crease; e, epidermis; d, dermis; des, dermo-epidermal suture.

nasal spine of the superior maxilla. The columella graft is sharpened at each end, and is made so long that once it is slipped into the countersunk depression already referred to, it will not move.

Because of lack of time I must curtail much that I should have liked to say on depressed nasal bridges (Figure XII, A and B).

From here one crosses the line which usually divides the oto-rhino-laryngologist from the plastic surgeon.

#### Total and Partial Rhinoplasty.

Total and partial rhinoplasty are procedures so well known and so well described that I do not propose to do much more than mention them.

However, I should like to warn the beginner against attempting to perform a total rhinoplasty on a patient who has not already a reasonable nasal and septal framework to work on. If the surgeon does not provide such a framework, his pride in his result will shrink proportionately with the miserable little nose which will eventually be all he has to show for his labours; but



A

B

FIGURE XIV.

Hump nose corrected by removal of median parts of nasal bones and upper alar cartilages and by infraction of nasal bones after they have been sawn.

should he efficiently provide such a framework, he will prove himself no tiro.

Face flaps are the only type to consider for this class of repair, because they are the only ones which give a reasonable colour texture match. Also, long tubes from elsewhere are most difficult to control on account of the weight-drag coming from the side or below, and this drag often prevents first-class union.

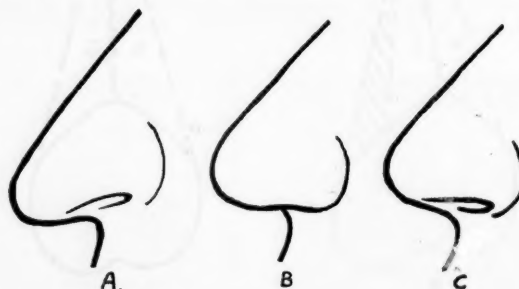


FIGURE XV.

The long nose (A), if simply shortened, turns into the nose (B) with overhanging ala. Trimming the lower edge of the upper alar cartilage improves the nose as at C.

For large repairs therefore I use almost exclusively the forehead, but for small alar repairs I cannot speak too highly of flap grafts from the cheek; these are easy to form, and because of their short length and light weight, give splendid results.

When the pedicle is divided and the unused part returned to the cheek, an admirable chance is frequently provided for reconstructing the groove between the ala and the cheek. This is done by what I described in 1933 as my dermo-epidermal suture, the epidermis of the cheek being united to the dermis of the new ala. As the raw surface heals it produces the natural groove and at the same time reproduces the convexity of the normal ala at this point (Figure XIII).

### Hump Nose, Long Nose, Bulbous Nose et cetera.

The correction of the hump nose, long nose, bulbous nose et cetera, because they are not associated with previous accident or disease, comes into one of the higher classes of plastic surgery—namely, cosmetic surgery. Remember, too, that because of the absence of prior injury, these



A

FIGURE XVI.

B

A, long overhanging hump nose treated by excision of hump, excision of lower part of septal cartilage, advancing of nasal tip and trimming of lower edge of upper alar cartilage. B shows the result.

patients are apt to be more particular about the final results, so the surgeon has to be especially careful.

Several of these deformities may be associated, so more than one corrective procedure may have to be carried out at

These operations mostly follow well-known lines; but in the past many operators have had indifferent results, chiefly attributable to the following factors.

1. *Hæmorrhage.* It has been gratifying to note the care which plastic and other surgeons abroad are now taking to avoid hæmorrhage, because it seems to me that they have been taught their lessons by a branch of our own art. I refer to those practising labyrinthine fenestration, where hæmostasis is so essential.

2. Neglect to undermine the nasal skin completely. Those who use the scissors for this, especially those who dissect by both opening and closing them, will have no such trouble.

3. Poor view. Acute-angled retractors on handles will avoid this.

4. Use of unduly fine rasps. When sufficiently coarse rasps cannot be bought, an engineer can cut suitable ones out of leather-maker's rasps, which are easily obtainable.

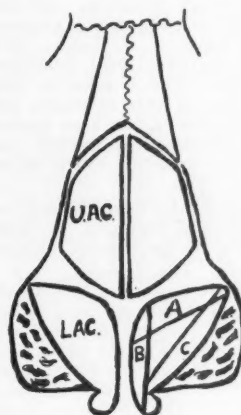


FIGURE XVIII.

The standard approach to the dorsum of the nose is by an incision between the upper alar cartilage (UAC) and the lower alar cartilage (LAC). Portions of the lower cartilage (A, B or C) can be trimmed off for different effects.

thoroughly undercut, an extremely good view of the dorsum of the nasal skeleton is obtained. The site of incision between the cartilages is easily determined by pressing the nasal tip upwards when the cartilage is seen to overlap.

The standard incisions for most of these operations are one on either side between the upper and lower alar cartilages, and one through the septum below the septal cartilage. When these three are joined

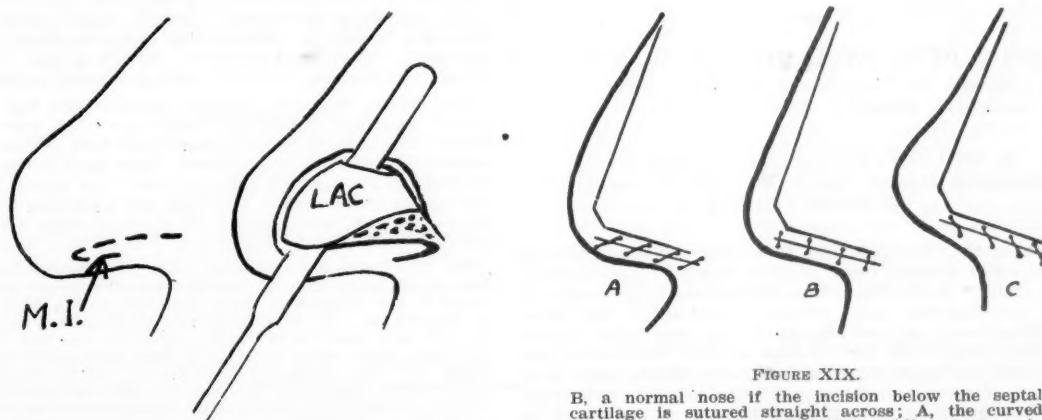


FIGURE XVII.

Method of adjusting lower alar cartilage through marginal incision (M.I.). Skin of ala is dissected free and lifted out of the way with spatula pushed up under the cartilage (LAC).

FIGURE XIX.

B, a normal nose if the incision below the septal cartilage is sutured straight across; A, the curved Semitic type of tip produced by oblique suture to retract tip; C, the advanced protruding tip produced by reverse suturing.

one time. In fact, in some cases the repairs may be so extensive that, to the uninitiated, it appears that the nose has been taken to pieces, almost turned inside out and then reassembled.

To cure a hump nose, one must remove not only the bony excess with rasps, chisels or saws, but also a certain amount of the median part of the upper alar cartilage (Figure XIV). The nose can easily be shortened by trimming away the lower edge of the cartilage of the septum; but if this is all the operator does, he will find that the alae will then hang too low and override the columella (Figures XV and



XVI). The adjacent edges of the upper and lower alar cartilages will also be found to overlap, and some of the lower edge of the former should be trimmed away with scissors. This corrects both deformities.

These noses are often associated with a bulbous tip or alae having large lower parts. Such a deformity is apt to appear exaggerated when the nose is shortened. The lower alar cartilage will then need trimming (Figure XVII). It is exposed by a second incision at the anterior and lateral edge of the nostril, which is carried up as a dissection between the skin and cartilage until connexion is made with the former incision. The mucosa is then dissected off the vestibular surface of this cartilage, and after the skin from the marginal incision has been hooked upwards, a spatula is inserted between the mucosa and cartilage. The cartilage can then be trimmed above, below, or in front (Figure XVIII).

The tip of the nose can be made to turn upwards or downwards by pulling the columella forwards or backwards before closing the incision in the septum (Figure XIX).

Having at least some artistic taste is a great help to the surgeon. This will tell him such things as that, if one removes a hump from on a nose, a receding forehead will look worse unless the nose is shortened at the same time. It will also tell him that a mildly concave lower nasal bridge is sometimes better not filled in, but is better dealt with by shortening the nose and turning up the nasal tip, producing that provocative *retroussé* upturned model at present much in favour amongst candidates for cosmetic plastic treatment.

When surgery of this type is completed, hæmatoma formation is guarded against by light nasal packing and by the application of an external dental composition and metal splint. Should a hæmatoma form in spite of precautions, it can be evacuated under anæsthesia with Blakesley's forceps inserted through the lateral intercartilaginous incision.

#### Conclusion.

There are innumerable other problems of nasal plastic repair that I should have liked to comment upon, but I think you will agree that I have already crowded more than a convenient amount of material into the time available.

#### REPORT OF AN INVESTIGATION INTO AN OUTBREAK OF POLIOMYELITIS IN A SMALL TOWN REMOTE FROM MELBOURNE.

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DURING the 1949 epidemic of poliomyelitis in Victoria, Australia, I investigated a small outbreak of poliomyelitis in a country town remote from Melbourne. The results of this investigation give further evidence of the close correspondence between the presumed incubation period of poliomyelitis and the interval between inoculation and the onset in cases of poliomyelitis in which there is a history of recent prophylactic inoculation. In two cases, the possibility of syringe transmission of poliomyelitis could not be excluded.

#### Findings.

An outbreak of poliomyelitis commenced in August, 1949, in a small country town remote from Melbourne and some twenty miles from the next town. No accurate population figures are available, but the population of the town in which the outbreak occurred was less than 3000.

There were eight clinical cases of poliomyelitis in this outbreak, all paralytic, and occurring within a month of

the onset in the first case. The last case reported previous to those was in 1946, and none have been reported since.

The first two patients were a brother and sister who became ill at approximately the same time. The girl was aged eighteen years, and was employed as a clerk in a firm of solicitors in the township up to the time of the onset of her illness. She felt indisposed on August 14, but continued at work until August 17, when she went to bed. On August 21 she developed some weakness of the left arm. Her brother, aged twenty years, up to the onset of his illness, was employed delivering bread to the residents of the town. He continued at work until August 17, when he commenced vomiting and developed weakness and pain in the legs and back and went to bed. The weakness in his legs and back rapidly recovered.

The family in which the above two cases occurred was a large one, there being three girls and four boys. Most of the family had a mild upper respiratory tract infection prior to the onset of the illness in the brother and sister. The only direct contact between this family and persons not resident in the same town was with a visitor from a suburb of Melbourne, approximately one month before the onset of the illness in the brother and sister. This visitor, although apparently well himself, came from an area in which known cases of poliomyelitis were occurring at the time.

The third patient was a baby boy, aged nine months, who became fretful, feverish and "off colour" on August 27. On September 1 it was noticed that he had flaccid paralysis of the left arm.

The fourth patient was a male, aged twenty-five years, who became ill on August 28. He developed paresis of both legs. He had had direct contact with both the baker boy and the baker's father.

The fifth patient was a female, aged twenty years, who was a contact of the baker boy and of the school children belonging to that family.

The sixth patient was a male, aged eleven months, who became ill on September 1 and developed flaccid paralysis of the left arm on September 3.

The seventh patient was a male, aged thirty-five years, who became feverish on September 2. During the next few days he developed severe flaccid paralysis of both legs with bladder involvement. This man had had contact with the baker and baker's father.

The eighth patient was a female, aged twenty-three years, who became ill on September 10 and on September 13 developed right facial paresis. She had had indirect contact (through her husband) with the fourth patient.

The fourth, fifth and seventh patients had had direct contact with one of the first cases—the male, who was a baker. The last dates of contact with this patient were respectively eleven days, eleven days and fifteen days previous to the onset of poliomyelitis. The eighth patient had had indirect contact (through her husband) with the fourth patient, and became ill thirteen days after the onset in that case.

The third patient was a male, aged nine months, who had received an inoculation of combined diphtheria and pertussis toxoid in the upper part of the left arm eleven days before he became ill. He developed complete flaccid paralysis of the left arm and considerable paresis of the left forearm five days later—namely, sixteen days after the injection. When he was examined one month later, considerable improvement had occurred in the left forearm muscle, which could move against gravity; some improvement had occurred in the biceps, brachialis and triceps, but only slight improvement had occurred in the deltoid. Twelve months after the onset almost complete recovery had occurred; there was still slight weakness of the deltoid, but no other weakness was demonstrable.

The sixth patient, a male, aged eleven months, had received an injection of combined diphtheria toxoid and pertussis vaccine in the upper part of the left arm, fourteen days before the onset of his illness. Two days after the onset (sixteen days after the inoculation) he developed flaccid paralysis of the left arm. One month after the onset considerable return of function in the forearm muscles and a lesser degree of recovery in the brachialis, biceps and

triceps had occurred. The deltoid still remained flaccid. Twelve months after the onset considerable improvement had occurred, but there was still considerable weakness of his left deltoid.

In the third and sixth cases no history of direct contact with any of the other patients could be obtained, but there was a history of indirect contact (i) through the mother, (ii) through the doctor, (iii) through the doctor's nurse, with the other patients. At the time of the inoculations the doctor's nurse (a member of the household) had a mild upper respiratory tract infection.

An investigation of the milk and ice-cream supply failed to reveal any evidence that milk or ice-cream played any part in the spread of this epidemic.

#### Discussion.

The occurrence of two more or less identical cases of poliomyelitis in young babies in an isolated outbreak of poliomyelitis is unusual. There was a two-day interval between the inoculations and a two-day interval between the onset of paralysis in these cases.

The incubation period presumed from the interval between contact and the onset of symptoms was between eleven and fifteen days in the other cases. In the case of the babies the intervals between inoculation and the onset were eleven days and fourteen days respectively. No other cases of paralysis following inoculation in the two-year period preceding the onset in these two cases had been encountered by the attending doctor.

There are two possibilities to be considered: (i) that the babies at the time of inoculation were suffering from a subclinical infection with poliomyelitis virus; (ii) that syringe transmission of poliomyelitis virus might have occurred owing to syringe or needle contamination (a) from the naso-pharyngeal secretions or faeces of the doctor or nurse, either directly or by the hands, or (b) from previous contamination of the syringe by its use on another affected subject. The method of syringe sterilization used was immersion in *Spiritus Vini Methylatus*.

Although it seems most likely that subclinical infection with poliomyelitis virus existed at the time of inoculation, syringe transmission could not be excluded.

#### Summary.

Evidence is presented of the close correspondence between the presumed natural incubation period of poliomyelitis and the interval between inoculation and the onset of poliomyelitis in two patients receiving prophylactic inoculations during an isolated epidemic of poliomyelitis. The possibility of syringe transmission could not be excluded in these cases.

#### Acknowledgements.

I gratefully acknowledge the encouragement and guidance given me by Dr. E. V. Keogh and Dame Jean Macnamara.

#### THE RELATION OF PROPHYLACTIC INOCULATIONS TO THE ONSET OF POLIOMYELITIS: A STUDY OF 620 CASES IN THE VICTORIAN EPIDEMIC OF POLIOMYELITIS IN 1949.

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The earlier findings of an investigation into the relation of prophylactic inoculations to the onset of poliomyelitis made in Victoria, Australia, during 1949, have already been published; the complete findings of this investigation are now presented.

There were 675 cases of poliomyelitis notified in Victoria from January to November, 1949; of these, 620 were investigated. At the time of the first report, 375 cases of poliomyelitis had been notified; of these 340 were investigated.

Of the 300 cases reported subsequent to then, 280 were investigated; in 20 cases investigation proved impossible, either because of inaccessibility of the patient, or because of inability to contact the parents.

No selection was made of patients whose parents were interviewed, and every effort was made to interview the parents of every patient reported; but in 55 cases (35 in the first 375 notified, 20 in the next 300) this proved impossible.

The method of inquiry and the criteria for diagnosis and the assessment of the site of paralysis and its severity were exactly the same in the latter part as in the former part of the investigation, and have already been recorded.

#### Findings.

There were 53 patients who had received an injection of diphtheria toxoid or pertussis vaccine, alone or in combination, within three months of the onset of symptoms, for whom exact information on the date and site of injection could be obtained. The findings in the seven cases in which some degree of doubt existed as to the date and site have been omitted. There were no other cases in the 620 investigated in which a history of an inoculation of diphtheria toxoid or pertussis vaccine, or both, within three months of the onset was obtained.

Of the 53 cases, the relevant data for 31 have already been published; the data for the additional 22 cases investigated are contained in Table I.

All the subsequent tables (II to X) are presented in three parts: A, containing the results of the first 340 cases investigated (reported Cases 1 to 375); B, containing the results of the next 280 cases investigated (reported Cases 375 to 675); C, containing the combined results for the total 620 cases investigated (reported Cases 1 to 675).

#### Relation of the Site of Inoculation to Site of Paralysis.

The data in Table I on the relation of the site of inoculation (at any time up to three months before the onset) to the site of paralysis are collected in Table II.

From the results set out in Table II, it was concluded that paralysis was distinctly more frequent in the inoculated than in the uninoculated extremities in those patients who received pertussis vaccine either alone or in combination. In the patients given only diphtheria toxoid, this difference was not so striking as when pertussis vaccine alone was used.

The results set out in Table IIb confirm the above conclusions, although the difference in paralysis in inoculated and uninoculated extremities in those patients receiving combined vaccine is somewhat less striking, because of the inclusion of two patients, each of whom had two extremities inoculated and who received their last inoculations seventy-six and ninety days prior to the onset. After such long intervals no causal relationship between inoculation and the onset of paralysis is probable.

The combined results set out in Table IIc cover a sufficient number of cases to render accurate statistical assessment possible, and confirm the previous conclusion.

In Table II it should be noted that all inoculations given within three months of the onset are considered—the relation between the site of inoculation and site of paralysis for the last inoculation given before the onset is considered later.

#### Immunization History of All Patients Investigated.

The immunization history of all patients investigated is summarized in Table III.

The immunization history obtained earlier in the investigation (Table IIIa) was similar to that obtained later (Table IIIb), and the combined results are set out in Table IIIc.

Of the 620 cases investigated, a history of previous immunization against whooping-cough, or diphtheria, or both, was obtained in 368. Of these patients, 118 received inoculations within one year of the onset of their poliomyelitis. In the remaining 252 cases no history of any immunizing procedure against whooping-cough or diphtheria at any period of the patient's life was obtained.

TABLE I.  
Cases 375 to 675: Findings in Respect of 22 Children Inoculated within Three Months of the Onset.

Case Number.	Patient's Age in Months.	Agent. <sup>1</sup>	Days Between Last Injection and Symptoms.	Limb Last Injected.	Paralysis in Injected Limb. <sup>2</sup>	Paralysis in Non-Injected Limbs.				Other Injections: Days before Onset and Sites of Injections.
						Right Arm.	Left Arm.	Right Leg.	Left Leg.	
444	10	P.	7	Left arm.	++++	0	..	0	0	14 (right arm), 21 (left arm).
408	25	P.D.	4	Left arm.	0	0	..	0	0	No other injections. <sup>3</sup>
433	9	P.D.	9	Right leg.	+++	0	0	..	0	40 (left leg).
480	9	P.D.	11	Left arm.	++++	0	..	0	0	
513	14	P.D.	11	Left leg.	++++	0	0	++	..	45 (right leg), 59 (left leg), 73 (right leg).
458	16	P.D.	14	Right leg.	+++	0	0	..	0	45 (right arm).
482	11	P.D.	14	Left arm.	++++	0	..	0	0	42 (right arm), 70 (left arm).
582	29	P.D.	16	Right leg.	+++	0	0	0	0	
434	15	P.D.	30	Left leg.	++++	0	0	0	..	58 (right leg), 86 (left leg).
422	24	P.D.	35	Right arm.	++++	..	0	0	0	Also had injection 91 days before onset (? site).
572	30	P.D.	56	Left arm.	++++	0	0	..	0	
674	68	P.D.	76	Right arm.	0	..	..	0	++	
426	13	P.D.	90	Left arm.	0	..	..	++	++++	
407	15	D.	5	Left arm.	+	0	..	0	+	
551	18	D.	8	Left arm.	0	++++	..	0	+	50 (right arm).
441	86	D.	10	Left arm.	0	+	..	++	+	
676	105	D.	20	Left arm.	0	0	..	+	+	
603	90	D.	36	Left arm.	0	0	..	0	0	64 (left arm), 92 (left arm).
453	15	D.	50	Right arm.	0	..	..	0	++	
622	48	D.	50	Left arm.	+	..	0	0	0	91 (left arm).
588	89	D.	60	Right arm.	0	0	0	0	0	
401	87	D.	67	Left arm.	+	+	..	+	+	

<sup>1</sup> "P.", pertussis vaccine; "P.D.", combined pertussis and diphtheria toxoid; "D.", diphtheria toxoid.

<sup>2</sup> "++++", very severe—complete flaccid paralysis; "+++", severe—complete paralysis of at least one muscle group; "++", moderate partial paralysis of at least one muscle group sufficient to prevent movement of the involved joint against gravity by that group; "+", mild—lesser degrees of paralysis permitting movement against gravity; "0", nil—no detectable paralysis of an extremity.

<sup>3</sup> Severe right facial paralysis.

TABLE IIA.  
(Cases 1 to 375.)

Agent.	Inoculated Limbs.		Uninoculated Limbs.		Total Limbs.
	Paralysed.	Not Paralysed.	Paralysed.	Not Paralysed.	
Pertussis vaccine (6 cases)	1 leg. 8 arms.	0 2 arms.	1 leg. 2 arms.	10 legs. 0	12 12
Total	9 limbs.	2 limbs.	3 limbs.	10 limbs.	24
Combined pertussis and diphtheria toxoid (15 cases).	13 legs. 6 arms.	1 leg. 3 arms.	2 legs. 5 arms.	14 legs. 16 arms.	30 30
Total	19 limbs.	4 limbs.	7 limbs.	30 limbs.	60
Diphtheria toxoid (10 cases)	0 6 arms.	0 7 arms.	8 legs. 0	12 legs. 7 arms.	20 20
Total	6 limbs.	7 limbs.	8 limbs.	19 limbs.	40

TABLE IIB.  
Cases 375 to 675.

Agent.	Inoculated Limbs.		Uninoculated Limbs.		Total Limbs.
	Paralysed.	Not Paralysed.	Paralysed.	Not Paralysed.	
Pertussis vaccine (1 case)	0 1 arm.	0 1 arm.	0 0	2 legs. 0	2 2
Total	1 limb.	1 limb.	0	2 limbs.	4
Combined pertussis and diphtheria toxoid (12 cases).	7 legs. 3 arms.	2 legs. 8 arms.	3 legs. 0	12 legs. 13 arms.	24 24
Total	10 limbs.	10 limbs.	3 limbs.	25 limbs.	48
Diphtheria toxoid (9 cases)	0 4 arms.	0 8 arms.	8 legs. 2 arms.	10 legs. 4 arms.	18 18
Total	4 limbs.	8 limbs.	10 limbs.	14 limbs.	36



TABLE IIC.  
Cases 1 to 675.

Agent.	Inoculated Limbs.		Uninoculated Limbs.		Total Limbs.
	Paralysed.	Not Paralysed.	Paralysed.	Not Paralysed.	
Pertussis vaccine (7 cases) .. .. .	1 leg. 9 arms.	0 3 arms.	1 leg. 2 arms.	12 legs. 0	14 14
Total .. .. .	10 limbs.	3 limbs.	3 limbs.	12 limbs.	28
Combined pertussis and diphtheria toxoid (27 cases).	20 legs. 9 arms.	3 legs. 11 arms.	5 legs. 5 arms.	26 legs. 29 arms.	54 54
Total .. .. .	29 limbs.	14 limbs.	10 limbs.	55 limbs.	108
Diphtheria toxoid (19 cases) .. .. .	0 10 arms.	0 15 arms.	16 legs. 2 arms.	22 legs. 11 arms.	38 38
Total .. .. .	10 limbs.	15 limbs.	18 limbs.	33 limbs.	76

*Interval between Injection and the Development of Symptoms.*

Table I includes all persons who had received a prophylactic inoculation of one of the three agents within three months of the onset of symptoms. It would be

TABLE IIIA.  
(Cases 1 to 375.)

Agent.	Period Preceding Onset in which Last Inoculation was Received. <sup>1</sup>		
	Under Three Months.	Between Three Months and Twelve Months.	More than One Year.
Pertussis vaccine .. .. .	6	3	9
Combined pertussis and diphtheria toxoid .. .. .	15	8	51
Diphtheria toxoid .. .. .	10	19	61
Unknown .. .. .	4	0	25
Total .. .. .	35	30	146

<sup>1</sup> Not immunized, 129 subjects.

expected that the number of inoculations would be the same in each month. That is far from the case as appears from Table IV (extracted from Table I). In this table,

TABLE IIIB.  
(Cases 375 to 675.)

Agent.	Period Preceding Onset in which Last Inoculation was Received. <sup>1</sup>		
	Under Three Months.	Between Three Months and Twelve Months.	More than One Year.
Pertussis vaccine .. .. .	1	3	8
Combined pertussis and diphtheria toxoid .. .. .	12	9	35
Diphtheria toxoid .. .. .	9	14	53
Unknown .. .. .	3	2	8
Total .. .. .	25	28	104

<sup>1</sup> Not immunized, 123 subjects.

every inoculation received by each subject within ninety-two days of the onset is included; many of these patients, of course, received multiple injections in that period.

The results set out in Table IVb show no significant difference from those in Table IVA, though, considered by themselves, they are not conclusive.

From Table IVC, which gives the data for the whole series, it is clear that the more recent the injection of any agent, the more likely is its association with the onset of poliomyelitis; this association is significant for diphtheria toxoid alone, as well as for pertussis vaccine alone or in combination.

TABLE IIIC.  
(Cases 1 to 675.)

Agent.	Period Preceding Onset in which Last Inoculation was Received. <sup>1</sup>		
	Under Three Months.	Between Three Months and Twelve Months.	More than One Year.
Pertussis vaccine .. .. .	7	6	17
Combined pertussis and diphtheria toxoid .. .. .	27	17	86
Diphtheria toxoid .. .. .	19	33	114
Unknown .. .. .	7	2	33
Total .. .. .	60	58	250

<sup>1</sup> Not immunized, 252 subjects.

*Relation between the Last Injection and Site of Paralysis.*

The data are arranged in Table I to indicate that the last injection given prior to the onset of symptoms was that usually associated with the site of paralysis. These findings are further summarized in Table V.

TABLE IVA.  
(Cases 1 to 375.)

Agent.	Interval Between Inoculation and Onset of Symptoms.		
	1 to 30 Days.	31 to 60 Days.	61 to 92 Days.
Pertussis vaccine (6 cases)	9	5	1
Combined pertussis and diphtheria toxoid (15 cases)	18	6	2
Diphtheria toxoid (10 cases)	11	3	0
Total (31 cases) .. .. .	38	14	3

The evidence of localization in the limb last injected when pertussis vaccine was used alone or in combination was just as convincing in the latter as in the former part of the investigation.

There is no evidence of localization in the limb last injected when diphtheria toxoid was used, even if we confine attention to the upper extremities. (No injections of diphtheria toxoid were made in the lower extremities.) The findings in each part of the investigation were almost identical.

TABLE IVb.  
(Cases 375 to 675.)

Agent.	Interval Between Inoculation and Onset of Symptoms.		
	1 to 30 Days.	31 to 60 Days.	61 to 92 Days.
Pertussis vaccine (1 case) ..	3	0	0
Combined pertussis and diphtheria toxoid (12 cases) ..	8	8	5
Diphtheria toxoid (9 cases) ..	4	5	4
Total (22 cases) ..	15	13	9

TABLE IVc.  
(Cases 1 to 675.)

Agent.	Interval Between Inoculation and Onset of Symptoms.		
	1 to 30 Days.	31 to 60 Days.	61 to 92 Days.
Pertussis vaccine (7 cases) ..	12	5	1
Combined pertussis and diphtheria toxoid (27 cases) ..	26	14	7
Diphtheria toxoid (19 cases) ..	15	8	4
Total (53 cases) ..	53	27	12

*Interval between the Last Inoculation and the Onset of Symptoms.*

The interval between the last inoculation given and the onset of symptoms for the 53 cases set out in Table I is summarized in Table VI. From Table VI it is seen that in 41 out of 53 cases the last inoculation before the onset was given within thirty days of the onset.

From the earlier results (Table VIa) it was concluded that the interval between the last inoculation and the onset corresponded closely with the incubation period of poliomyelitis. This conclusion was confirmed by the results of the latter part of the investigation. The results of the complete investigation are convincing.

*Relation of Inoculation to the Site and Severity of Paralysis in the Subjects under Three Years of Age.*

In the earlier part of the investigation it was clear that there was a considerable increase in the severity of

28 subjects aged under three years receiving pertussis vaccine either alone or in combination within three months of the onset of symptoms, the paralysis in the limb or limbs last inoculated was as shown in Table VII.

In the six subjects aged under three years receiving an inoculation of diphtheria toxoid alone within three months of the onset of symptoms, the paralysis in the limb or limbs last inoculated was as shown in Table VIII.

The degree of paralysis in 75 children aged under three years (out of the 109 children aged under three years investigated) who did not receive an inoculation of either pertussis vaccine or diphtheria toxoid alone or in combination is shown in Table IX.

It is clear that there was a considerable increase in the severity of paralysis in the last inoculated limbs of those children, aged under three years, who received an injection of pertussis vaccine within three months of the onset

TABLE V.

Agent.	A. (Cases 1 to 375.)		B. (Cases 375 to 675.)		C. (Cases 1 to 675.)	
	Paralysed.	Not Paralysed.	Paralysed.	Not Paralysed.	Paralysed.	Not Paralysed.
<i>Paralysis in Last Inoculated Limb.</i>						
Pertussis vaccine .. ..	1 leg. 6 arms.	0 0	0 1 arm.	0 0	1 leg. 7 arms.	0 0
Total .. ..	7 limbs.	0	1 limb.	0	8 limbs.	0
Combined pertussis and diphtheria toxoid .. ..	11 legs. 4 arms.	0 2 arms.	6 legs. 3 arms.	0 6 arms.	17 legs. 7 arms.	0 8 arms.
Total .. ..	15 limbs.	2 limbs.	9 limbs.	6 limbs.	24 limbs.	8 limbs.
Diphtheria toxoid .. ..	0 4 arms.	0 7 arms.	0 3 arms.	0 7 arms.	0 7 arms.	0 14 arms.
Total .. ..	4 limbs.	7 limbs.	3 limbs.	7 limbs.	7 limbs.	14 limbs.
<i>Paralysis in Other than Last Inoculated Limb.</i>						
Pertussis vaccine .. ..	1 leg. 4 arms.	10 legs. 2 arms.	0 0	2 legs. 1 arm.	1 leg. 4 arms.	12 legs. 3 arms.
Total .. ..	5 limbs.	12 limbs.	0	3 limbs.	5 limbs.	15 limbs.
Combined pertussis and diphtheria toxoid .. ..	4 legs. 7 arms.	15 legs. 17 arms.	4 legs. 0	14 legs. 15 arms.	8 legs. 7 arms.	29 legs. 32 arms.
Total .. ..	11 limbs.	32 limbs.	4 limbs.	29 limbs.	15 limbs.	61 limbs.
Diphtheria toxoid .. ..	8 legs. 2 arms.	12 legs. 7 arms.	8 legs. 3 arms.	10 legs. 5 arms.	16 legs. 5 arms.	22 legs. 12 arms.
Total .. ..	10 limbs.	19 limbs.	11 limbs.	15 limbs.	21 limbs.	34 limbs.

of poliomyelitis; no such increase in the severity of paralysis was observed in the last inoculated limbs of those children, aged under three years, who received an injection of diphtheria toxoid alone within three months of the onset of poliomyelitis.

TABLE VIA.  
(Cases 1 to 375.)

Agent.	Interval Between Last Inoculation and Onset of Symptoms.		
	1 to 30 Days.	31 to 60 Days.	61 to 92 Days.
Pertussis vaccine (6 cases)	6	0	0
Combined pertussis and diphtheria toxoid (15 cases)	14	1	0
Diphtheria toxoid (10 cases)	8	2	0
Total (31 cases)	28	3	0

### Discussion.

Further evidence provided by an investigation of an additional 280 cases of poliomyelitis in Victoria during 1949 is presented, together with the previous findings of

TABLE VIB.  
(Cases 375 to 675.)

Agent.	Interval Between Last Inoculation and Onset of Symptoms.		
	1 to 30 Days.	31 to 60 Days.	61 to 92 Days.
Pertussis vaccine (1 case)	1	0	0
Combined pertussis and diphtheria toxoid (12 cases)	8	2	2
Diphtheria toxoid (9 cases)	4	4	1
Total (22 cases)	13	6	3

an investigation of 340 cases of poliomyelitis in Victoria during 1949, concerning a relationship between recent prophylactic inoculation and the onset of poliomyelitis.

TABLE VIC.  
(Cases 1 to 675.)

Agent.	Interval Between Last Inoculation and Onset of Symptoms.		
	1 to 30 Days.	31 to 60 Days.	61 to 92 Days.
Pertussis vaccine (7 cases)	7	0	0
Combined pertussis and diphtheria toxoid (27 cases)	22	3	2
Diphtheria toxoid (19 cases)	12	6	1
Total (53 cases)	41	9	3

The basic data for the two groups investigated have been presented together in this paper to facilitate comparison. The findings made in the latter part of this investigation coincide with those made earlier in all respects, except

in so far as inoculations with diphtheria toxoid are concerned. The evidence of the existence of a relationship between recent inoculations with diphtheria toxoid and the onset of poliomyelitis was less conclusive in the latter compared with the former part of this investigation.

TABLE VII.

Extremity Inoculated.	Severity of Paralysis.					Total Number of Extremities Inoculated.
	++++	+++	++	+	0	
Right arm ..	2	0	1	0	2	5
Left arm ..	4	3	0	0	4	11
Right leg ..	3	4	2	0	0	9
Left leg ..	5	1	1	0	0	7
Total ..	14	8	4	0	6	32

Since the publication of the report on the earlier Victorian findings, Bradford Hill and Knowelden have shown conclusively that a relationship existed between recent injections and paralysis in England and Wales during 1949,

TABLE VIII.

Extremity Inoculated.	Severity of Paralysis.					Total Number of Extremities Inoculated.
	++++	+++	++	+	0	
Right arm ..	1	0	0	0	3	4
Left arm ..	0	0	0	2	1	3
Right leg ..	0	0	0	0	0	0
Left leg ..	0	0	0	0	0	0
Total ..	1	0	0	2	4	7

particularly with inoculation procedures carried out within the month preceding the recorded date of onset of the illness. They found that in those patients inoculated within a month of the onset of their attack of poliomyelitis,

TABLE IX.

Extremity.	Severity of Paralysis.					Total Number of Extremities.
	++++	+++	++	+	0	
Right arm ..	0	1	2	4	68	75
Left arm ..	0	3	1	7	64	75
Right leg ..	6	7	7	27	28	75
Left leg ..	4	6	10	18	37	75
Total ..	10	17	20	56	197	300

the distribution of the bodily sites of paralysis was quite abnormal. There was, in these cases, a high incidence of paralysis in the arms instead of a normal concentration upon the legs, and there was an excess in the left arm compared with the right (inoculations were given predominantly in the arms, and mainly in the left). Also, when the site of inoculation was compared with the site or sites of paralysis, the two sites frequently coincided when the inoculation had been given within the previous month, and came together less frequently when the inoculation was an event of the more distant past.

A comparison of paralysis in inoculated and uninoculated limbs of children who had recently received prophylactic



inoculations showed an excess of paralysis in the former. These English observations correspond closely to those made in Victoria.

In the English investigation, of 62 children who had received their last inoculation within three months of the onset, 42 had received the inoculation within twenty-eight days of the onset. Of these 42, 31 had received an inoculation in the seven-day to seventeen-day interval immediately preceding the onset.

These findings correspond closely with those recorded in this paper. Of 53 children in Victoria who had received their last inoculation within three months of the onset, 40 received an inoculation within twenty-eight days of the onset; of these 40, 29 received an inoculation in the seven-day to seventeen-day interval immediately preceding the onset.

The close correlation between this interval and the presumed incubation period of poliomyelitis has already been commented on, and the possible explanations have been discussed.

Bradford Hill and Knowelden express the opinion that the relative risk of poliomyelitis following an inoculation with different antigens cannot be estimated from an investigation of the type recorded here. This is undoubtedly true in the sense that an exact numerical assessment cannot be made from the data at present available. However, a rough estimate of the relative influences of combined diphtheria-pertussis prophylactic and the simple diphtheria toxoid can be made on the following lines. Ample evidence has been produced in the published data that inoculations given over one month from the onset have a negligible influence on the development of paralysis. From Hill and Knowelden (Tables VI and VII) it is seen that more subjects of poliomyelitis received injections of diphtheria toxoid than received injections of combined diphtheria-pertussis prophylactic within one to three months of the onset, but that over twice as many subjects had received injections of combined diphtheria-pertussis prophylactic as had received injections of diphtheria toxoid within the month immediately preceding the onset.

Similarly, in Victoria during 1949, we find that whereas approximately an equal number of subjects of poliomyelitis had received injections of combined diphtheria-pertussis prophylactic and of simple diphtheria toxoid within one to three months of the onset, approximately twice as many subjects had received combined diphtheria-pertussis inoculations within a month of the onset as had received simple diphtheria toxoid inoculations.

Although the number of subjects receiving pertussis vaccine alone is small in both the Victorian and the English series, nevertheless in both series there is a similar difference to that observed between the results following (a) combined diphtheria-pertussis prophylactic and (b) simple diphtheria toxoid. The detailed findings are set out in Table X.

In the foregoing argument, it has been assumed that the relative rates of immunization with the different antigens throughout the epidemic were unchanged; in Victoria, as far as can be ascertained, no change in the relative use of the different antigens occurred during 1949—certainly there was no great increase in the use of pertussis vaccine, alone or in combination, with the progress of the epidemic.

On the other hand, in the United Kingdom during 1949 the use of combined vaccine was increasing just as poliomyelitis became epidemic, and this might make the association appear excessive.

Nevertheless, it appears highly probable that the onset of paralytic poliomyelitis followed the administration of pertussis vaccine, alone or in combination, more frequently than when diphtheria toxoid alone was administered.

The severity of paralysis in children who had received prophylactic inoculations within three months of the onset in Victoria during 1949 is given in Table I. The paralysis

in the extremity last inoculated before the onset for children, aged under three years, who had received pertussis vaccine alone or in combination, is summarized in Table VII. Comparable data for the subjects who had received diphtheria prophylactic are summarized in Table VIII. The severity of paralysis in the extremities of non-inoculated children aged under three years is given in Table IX.

The severity of paralysis in the last inoculated extremities of children who had received pertussis vaccine alone or in combination was greater than in those of children who had received diphtheria toxoid alone, and also greater than in the corresponding extremities of non-inoculated children.

TABLE X.

Agent.	Last Inoculation Within One Month of Onset.	Last Inoculation Between One and Three Months of Onset.
<i>Figures of Bradford Hill and Knowelden.</i>		
Pertussis vaccine .. .. .	5	0
Combined pertussis and diphtheria toxoid .. .. .	27	7
Diphtheria toxoid .. .. .	11	12
<i>Victorian Figures.</i>		
Pertussis vaccine .. .. .	7	0
Combined pertussis and diphtheria toxoid .. .. .	22	5
Diphtheria toxoid .. .. .	12	7

Thus there is evidence that recent inoculations of pertussis vaccine alone or in combination with diphtheria toxoid are more likely to be followed by paralysis than recent inoculations of diphtheria toxoid alone, and that the paralysis following inoculations with pertussis vaccine alone or in combination is more severe than that following diphtheria toxoid alone.

Obviously a forward inquiry of the type suggested by Bradford Hill and Knowelden is indicated to determine the relative risks of paralysis following inoculations with the different antigens for given levels of poliomyelitis incidence; but until such time as the results of such an investigation are known, administrative action should be guided by the above findings.

#### Summary.

Further evidence of a relationship between recent prophylactic inoculations and the onset of poliomyelitis during the 1949 epidemic of poliomyelitis in Victoria is presented, in particular for pertussis vaccine inoculations either alone or in combination.

The evidence for such a relationship between diphtheria toxoid inoculation and the onset of poliomyelitis is less conclusive.

#### Acknowledgements.

I am indebted to the Chairman of the Health Commission of Victoria, Dr. G. E. Cole, for permission to publish this paper. I desire again to thank Dr. E. V. Keogh and Dame Jean Macnamara for their encouragement and guidance. My thanks are due also to Professor Bradford Hill, who was kind enough to favour me with his comments on the statistical aspects of a section of this report.

#### References.

- Hill, A. Bradford, and Knowelden, J. (1950), "Inoculation and Poliomyelitis: A Statistical Investigation in England and Wales", *British Medical Journal*, Volume II, page 1.
- McCloskey, B. P. (1950), "The Relation of Prophylactic Inoculations to the Onset of Poliomyelitis", *The Lancet*, Volume I, page 659.

# THE MANAGEMENT OF THE INFECTED HAND: BASED ON A CLINICAL INVESTIGATION OF 513 CASES.

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Brisbane.

THERE is still a considerable difference of opinion as to when an infected hand should or should not be opened, and finality with regard to the surgical management in these cases has not been reached. An investigation was undertaken to find, if possible, definite indications for operative interference, and by employing different methods of treatment in comparable cases, to determine what treatment gives the most satisfactory results.

The abnormally prolonged healing time associated with hand infections has been variously ascribed to the type or virulence of the causative organism, the anatomical site and dimensions of the incision, the material with which the wound is drained, and the technique of wound dressings. No doubt these and other factors play a part; but the greatest single factor is the presence of necrotic tissue. In the process of healing necrotic tissue must be autolysed and absorbed or sequestered (a process which takes longer than the full healing time of a surgical incision), and after its removal, the resulting defect must be made good by granulation and epithelial growth.

Secondary infection (a common cause of delayed healing) frequently occurs in a sloughing wound; dead tissue is a good nidus and is readily accessible to organisms, since the wound is open and moist, requiring frequent dressings with consequent repeated exposure.

The technique of wound dressing has often been blamed for the introduction of secondary infection, and this, up to a point, is true; but the incidence of secondary infection in any wound-dressing clinic would be much less if the wounds were free from moist dead tissue. The quickest way of ridding the host of dead tissue is to excise it *en masse*, a procedure which in the pre-antibiotic days would have been hazardous, but which now should be the method of choice. In order to reduce further the incidence of bacterial contamination and to hasten healing, the open wound should be converted into a closed wound by suture. These principles form the basis of primary treatment, to be discussed later.

The duration of the infection before treatment, the presence and degree of necrosis, and the amount of clinical tension in the affected area were investigated in order to determine what part they play in influencing the healing time, and whether they may be used as a guide to the optimum time for incision.

The investigation was carried out in a special hand clinic, which was under a single direction. Apart from the fact that the operations were performed by more than one surgeon, details of clinical management in all comparable cases were standardized, and records were kept in a punch-card filing system designed for the purpose.

In order to obtain comparable lesions, infections were divided into three categories. Those infections associated with a history of pain for twenty-four to forty-eight hours, slightly raised tension, and some redness and tenderness, without indications of the presence of pus, were put in category A; category B infections were those with signs or indications of abscess formation, or those in which high tension was present, and the infection was of three or more days' duration; category C infections were those in which some complicating factor was present, such as skin necrosis with spontaneous discharge, or spread to involve another anatomical space—for example, a subcutaneous infection with spread to a web space, or paronychia with a subungual abscess. Collar-stud abscesses occurring in any type of lesion were regarded as C infections, as in these cases necrosis of the true skin with sinus formation is present.

In estimating both the amount of tension and the degree of necrosis, three grades were recognized. Grade I tension presented a slight resistance to the examining finger, grade II a firm rubbery resistance, grade III a hard and woody sensation.

Difficulty was found in standardizing the degree of necrosis present in different types of lesion; in general, the presence of a skin sinus with a small plug of slough, or a small deep slough after incision, caused the lesion to be regarded as belonging to grade I. When the necrosis involved a larger amount of deep tissue or a definite area of skin, grade II was recorded. In grade III relative disorganization of the area was present—for example, a pulp space infection with death of skin, pulp tissue and phalanx, or a subcutaneous infection with gross loss of tissue, a shaggy, thickened tendon sheath being left exposed.

The healing time in all cases was estimated from the day of incision to the time when the wound was firmly closed and free from surface moisture. The usual time for such healing in any surgical wound is approximately seven days, but in some cases it was remarkable that such a dry, firmly-closed wound resulted in as short a time as four days. When incisions were sutured, the sutures were removed on the fifth or sixth day. If any moisture then existed, a further one or two days were allowed to elapse before healing was recorded as complete.

## Necrosis and Duration of Infection.

The incidence of necrosis in relation to the duration of the infection was observed in 477 cases. It was found (Table I) that when the infection had been present for

TABLE I.  
Incidence of Necrosis in Relation to the Duration of the Infection.

Infection.	One Day.	Two Days.	Three Days.	Four Days.	Over Four Days.
Pulp space infection.	— (4 cases)	18% (22 cases)	30% (23 cases)	42% (26 cases)	67% (79 cases)
Subcutaneous infection.	— (11 cases)	13.3% (30 cases)	29.4% (34 cases)	46.6% (45 cases)	70.7% (64 cases)
Paronychia ..	— (1 case)	— (13 cases)	17.6% (17 cases)	36.7% (19 cases)	51% (43 cases)
Web space infection.	— (4 cases)	20% (5 cases)	55.5% (9 cases)	28.5% (7 cases)	60% (21 cases)
Total ..	— (20 cases)	12.8% (70 cases)	31.3% (83 cases)	42.4% (97 cases)	67% (207 cases)

one day only, no necrosis was seen; when it had been present for two days, in 12.8% necrosis was found; when it had been present for three days, in 31.3%; for four days, in 42%; and for over four days, in 67%. These figures show that during the third day of the infective process there is a considerable increase in the incidence of necrosis, from 12.8% after two days, to 31.3% after three days.

The incidence of clinical complications after the second day shows a similar increase. It will be seen from the graph (Figure 1), in which the percentage incidence of each category is plotted against the duration of infection, that the incidence of category C infections increases from 5% after one day's duration to 30% after three days. When the infective process has been present for two days, 88% of all cases present as category B infections, and from that day onward the incidence of complications increases rapidly.

## Healing Time and Necrosis.

Observations on the healing time of comparable lesions in relation to the degree of necrosis present showed (Table II) that in 180 cases of subcutaneous infections the healing time increased from nine days when necrosis was

absent, to 12.9 days when it was present in minimal amounts, and to 19.6 days when it was considerable. The corresponding healing times in 150 cases of pulp space infections were 11.6 days, 12.9 days and 29.9 days.

#### Tension and Necrosis.

On or after the third day of an untreated hand infection it often happens that the infected area points and discharges a little pus. Tension and pain immediately lessen, and patient and doctor alike are lulled into a false sense of security; beneath the small sinus in the skin a slough may exist and effectively prevent adequate drainage,

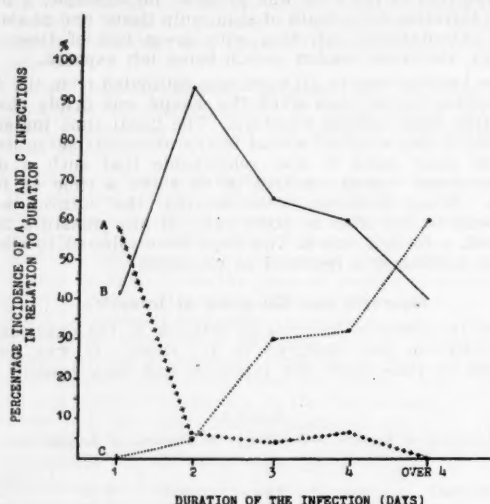


FIGURE 1.

tension again rises with a return of symptoms, and this process may be repeated several times, but the infection does not subside; indeed, it may by degrees become worse as progressive sloughing of deep tissue occurs.

In the investigation of the degree of necrosis in relation to the amount of tension present, cases associated with a sinus or sloughing skin wounds had to be excluded, though it is probable that, in view of the severe pain that many of these patients suffered before spontaneous discharge occurred, the tension was high initially.

Three hundred cases of pulp space and subcutaneous infections were studied (Table III), and it was found that necrosis was present in 27.1% of cases when the tension was of grade I, 40% when the tension was of grade II, and 55.5% when the tension was of grade III.

#### Conclusions.

It is open to question whether necrosis is the direct result of ischaemia arising from tension, or whether it is due to specific bacterial toxins. If tension alone is responsible for the death of tissue, its duration would be more significant than its degree, but it was found impossible to assess the duration of any given degree of tension.

However, since it has been shown that, in general, the degree of necrosis is in direct proportion to the amount of tension, regardless of its duration, the tension existing at any given time can be taken as a working index of the tissue viability; and since it has been shown that when dead tissue is present the healing time is considerably prolonged, the role of tension becomes of considerable importance in the management of hand infections.

The intensity of pain is usually in direct proportion to the degree of tension; therefore, the intensity and duration of pain *per se* may be used as a working index of viability, and therefore as a guide to operative interference.

From the above findings and inferences, it is concluded that incision should be made in any infection of two or more days' duration if severe pain has been present for twenty-four hours, or if the tension is high. It is unwise to wait for definite signs of the presence of pus.

TABLE II.  
Healing Time in Days in Relation to the Degree of Necrosis.

Infection.	Degree of Necrosis.		
	Grade I.	Grade II.	Grade III.
Pulp space (150 cases)	11.6% (74 cases)	12.9% (42 cases)	29.9% (34 cases)
Subcutaneous (180 cases)	9% (91 cases)	12.9% (55 cases)	19.6% (34 cases)
Total (330 cases)	10.6% (165 cases)	12.9% (97 cases)	24.7% (68 cases)

The aphorism "if the patient has had a sleepless night owing to pain—operate", is based on sound observation and can be relied upon in most instances.

In some cases of pulp space infection, when an incision has been made on the above indications, no frank pus is found; but this does not mean that the incision was

TABLE III.  
Incidence of Necrosis in Relation to the Degree of Tension.

Infection.	Degree of Tension.		
	Grade I.	Grade II.	Grade III.
Pulp space (128 cases)	29% (27 cases)	34% (59 cases)	55% (42 cases)
Subcutaneous (172 cases)	26% (54 cases)	44% (88 cases)	56% (30 cases)
Total (300 cases)	27% (81 cases)	40% (147 cases)	55.3% (72 cases)

unnecessary or ill-advised. If high tension is relieved, necrosis may have been prevented, and this is of greater moment than the mere evacuation of pus. Four hundred years ago Ambroise Paré wrote

... In the meantime the surgeon shall make way for the virulent and venenate matter by making incision in the inner part of the finger, even to the bone, for there is not a preventer remedy, if so be that it be quickly done and before the maturation of the matter, for it vindicates the finger from the corruption of the bones and nerves and assuages pain, a method which I have often and happily tried immediately at the beginning, even before the perfect impression of the virulency.

#### Treatment.

In order to establish the most effective treatment, seven different methods were employed, as follows: conservative treatment by immobilization of the hand and forearm on a plaster of Paris splint, and high elevation in a Saint John Ambulance sling; conservative treatment *plus* the oral administration of sulphathiazole—one gramme four-hourly to a maximum of 30 grammes; conservative treatment *plus* the systemic administration of penicillin—200,000 units twice daily; incision and drainage with glove rubber; incision and drainage *plus* the oral administration of sulphathiazole; incision and drainage *plus* the systemic administration of penicillin; and incision, excision of necrotic tissue, suture of the wound, and the systemic administration of penicillin.



The term "excision" is used here in the same sense as in the primary treatment of a wound—that is, the removal of dead tissue by cutting it away until healthy tissue is reached. The tissues most commonly involved in hand infections are the subcutaneous tissue forming part of the wall of an abscess cavity, fibrous tissue such as the palmar fascia, and skin—either the thin, blue, translucent skin overlying an abscess, or the margins of an existing sinus.

It was the original intention to maintain throughout the investigation equal numbers of cases in all treatment groups. It soon became apparent, however, that when penicillin was used the results were much better than when incision alone or incision and sulphathiazole were used. It was, therefore, considered unjustifiable, in the interests of the patient, to continue the use of the last-mentioned methods. The number of cases in these groups is, consequently, very much smaller than in the penicillin-treated groups. However, many series of cases in which these methods of treatment were used have been reported, and they show figures comparable with those in this series. Cases quoted by Florey and Williams, in conjunction with the present series of cases, are shown in Table IV.

With regard to the conservatively treated groups, 64 patients presented with category A infections; of these, 14 were treated solely by immobilization and elevation of the hand—two infections only subsided; ten were given sulphathiazole in addition—all infections went on to incision; 40 received penicillin, with resolution of the infection in 18 cases. In all of the 18 cases in which the infection subsided, the tension was lower than in the 24 in which it went on to abscess formation. Although the number of cases is too small to justify any conclusions, the impression gained was that early infections associated with little tension usually respond to penicillin therapy, but once a moderate degree of tension develops, penicillin is ineffective.

The results in infections treated by incision and sulphathiazole were, in most instances, similar to those in infections treated by incision alone; for the sake of simplicity, these figures have been excluded from the tabled results.

Table V shows the healing time in cases of pulp space infections, subcutaneous infections, paronychia and web space infections when treated by (i) incision alone, (ii) incision and penicillin therapy, (iii) incision, with or without excision, immediate suture of the wound, and penicillin therapy.

Pulp space infections treated by simple incision and drainage healed in 22.4 days. When, in addition to incision and drainage, penicillin was given systemically, the healing time was reduced to 16.5 days. In cases in which the wounds were sutured after incision (and excision of necrotic tissue when present), the healing time was 11.2 days. The corresponding times of healing in subcutaneous infections were 15.7 days, 17.2 days and 9.1 days.

It will be noted that, in paronychia infections, the healing time was greater after suture than when the wound was left open. This was thought to be due to the unsuitability of the nail fold for suture. In many cases in which this technique was employed, the sutures themselves caused necrosis—suture of most paronychia has now been discontinued.

Table VI illustrates that the difference in the healing time of category B and category C infections is considerable, irrespective of the method of treatment employed. The most significant finding in this analysis is that uncomplicated infections of any type heal in eight days when treated by incision and suture plus penicillin therapy.

Many infections are already complicated by spread or necrosis when first seen, and in most instances the blame for this lies at the feet of the patient. It has been shown that on and after the third day of the infection the incidence of complications rises rapidly. In this connexion it is interesting to note how long patients put up

with their "beat-hand" before seeking medical attention (Table VII); of 513 patients, 22 attended hospital after the first day of their infection, 75 after the second day, 93 after the third, 103 after the fourth, and 220 after the fourth and subsequent days. Thus, only 190 patients were examined within the first three days, and 323 after the third day, when the complication rate is rising rapidly.

TABLE IV.  
Healing Time: Treatment by Incision Alone.

Infection.	Healing Time in Days.	
	Florey and Williams.	Present Survey.
Pulp space .. ..	25.7% (23 cases)	22.4% (49 cases)
Subcutaneous .. ..	—	15.7% (37 cases)
Paronychia .. ..	15.5% (26 cases)	15% (27 cases)

In view of the large percentage of patients who do not seek treatment until late in the course of their infection, and in view of the efficacy of penicillin therapy in the early stages, an important function of the "hand clinic" is surely to instil into the public a "whitlow-consciousness".

TABLE V.  
Healing Time in Days in Relation to the Method of Treatment.

Infection.	Healing Time in Days.		
	Incision Alone.	Incision and Penicillin.	Incision, Excision, Suture, Penicillin.
Pulp space (149 cases) .. ..	22.4% (49 cases)	16.5% (21 cases)	11.2% (67 cases)
Subcutaneous (165 cases) .. ..	15.7% (37 cases)	17.2% (24 cases)	9.1% (111 cases)
Paronychia (88 cases) .. ..	15% (27 cases)	7.9% (26 cases)	9.2% (32 cases)
Web space (43 cases) .. ..	13.8% (6 cases)	13.5% (11 cases)	9.3% (26 cases)

#### Tendon Sheath Infections.

Tendon sheath infections have been separated from the main survey, as they present a somewhat different picture. Twenty-six cases in all came under review.

Two patients were successfully treated without incision; doubt must therefore exist as to the accuracy of the diagnosis. Clinically, the lesions were classical sheath infections associated with severe pain, uniform swelling of the whole finger, which was held in a rigid semi-flexed position, and tenderness in the line of the tendon maximal over the bulb of the sheath. The patients were febrile and had had at least one sleepless night. The first patient was given 200,000 units of penicillin and was inadvertently sent home. On the patient's reporting back next day, the signs and symptoms had subsided so much that operation was deferred, the infection rapidly subsided and full function was regained in four days. In view of this experience, a second patient was similarly treated with similar results.

In a third case of twenty-four hours' duration treatment by penicillin alone was given. After twenty-four hours the signs and symptoms were *in statu quo*. Operation was performed, and turbid fluid, yielding a culture of *Staphylococcus aureus*, was found in the sheath. The sheath was irrigated with penicillin solution and the wounds were sutured. After a further twenty-four hours the signs and symptoms were the same as before operation and on the day of the patient's admission to hospital; but during the succeeding forty-eight hours the infection rapidly subsided. In view of the lag of twenty-four hours after operation

before the infection began to subside, it is conceivable that resolution might have occurred if conservative treatment had been continued.

Two further infections clinically similar to the previous three (not included in the series) were seen in gouty subjects; they subsided rapidly with combined penicillin and colchicum therapy. Presumably the diagnosis was acute gouty teno-synovitis.

TABLE VI.

Healing Time in Days in Relation to the Method of Treatment, after Subdivision into Category B and C Infections.

Infection.	Healing Time in Days.		
	Incision Alone.	Incision and Penicillin.	Incision, Excision, Suture, Penicillin.
Pulp space	B. 12.2 C. 28.3	B. 13 C. 20.3	B. 8.6 C. 14.2
Subcutaneous	B. 11.5 C. 20.5	B. 16.6 C. 17.8	B. 8.4 C. 11.3
Paronychia..	B. 11.6 C. 17.6	B. 6.0 C. 10.0	B. 8.5 C. 10.0

Seven patients were treated by excision of the whole sheath (with the exception of the proximal phalangeal pulley), followed by closure of the skin incision.

This form of treatment was adopted on the grounds that the tendon and sheath are relatively avascular structures, and therefore unlikely to allow the access of penicillin in adequate bacteriostatic concentrations. Furthermore, the sheath forms an inelastic closed space in which tension can rapidly rise to the point of ischaemia. Excision

TABLE VII.

Duration of Infection (in Days) when Patient First Examined.

190 Cases.			323 Cases.	
One Day.	Two Days.	Three Days.	Four Days.	Over Four Days.
22	75	93	103	220

of the sheath with immediate suture of the skin incision was followed, in most cases, by primary intention healing of the wound in ten days. However, the return of function was slow and incomplete in some cases, the finger tip falling short of the palm by one to one and a half inches.

Irrigation of the sheath with penicillin by means of a ureteric catheter introduced into the sheath through separate incisions, one in the palm and one over the distal phalanx, was followed by more rapid healing, together with a more complete return of function. Seven patients were treated by sheath irrigation with an average healing time of 8.8 days.

The number of sheath infections presented is too small to allow any conclusions to be formed as to the best method of treatment; none the less there was an apparent remarkable reduction in the healing time as each new method of treatment was introduced (Table VIII): 44 days with incision alone, 19 days with incision *plus* penicillin, 10 days with excision of the sheath and skin suture, 8.8 days with irrigation of the sheath. To these may be added complete cure in four days with penicillin alone.

The results of tendon sheath infections cannot, of course, be gauged by the healing time alone, as is the case in the majority of other hand infections. Restoration of function is the main criterion of the adequacy of the treatment. Here, again, there is an apparent remarkable improvement in the end-results of the above methods of treatment: no useful function followed simple incision; incision *plus* the systemic administration of penicillin was followed by near-full function in two cases, a restricted but useful range of function in two cases, and no useful

function in three cases; excision of the sheath gave full or near-full function in all cases over a period of time ranging from two weeks to two months; irrigation of the sheath gave full or near-full function in all cases in one to three weeks.

TABLE VIII.

Healing Time (in Days) of Tendon Sheath Infections in Relation to the Method of Treatment.

Method of Treatment: 26 Cases.

Incision Alone.	Incision and Penicillin.	Excision of Sheath, Skin Suture and Penicillin.	Sheath Irrigation and Penicillin.	Conservative Treatment and Penicillin.
44 (3 cases)	19 (7 cases)	10 (7 cases)	8.8 (7 cases)	4 (2 cases)

From experience of these cases, it would seem that the methods of treatment likely to restore full function are sheath excision, sheath irrigation, and conservative treatment with penicillin; and of these, irrigation of the sheath appears to be the method of choice. The success of conservative treatment by penicillin alone may well depend on the same factors as suggested in other infections—that is, on the presence of an intrathecal tension which is low enough to allow the influx of penicillin in adequate concentration.

#### Summary.

An investigation of 513 cases of hand infections was carried out, and the following observations were made: (i) The presence of necrotic tissue delays the healing time considerably. (ii) When the tissue tension is high, necrosis is usually present. (iii) The incidence of necrosis and spread of the infection increase rapidly after the second day of the infective process.

It is concluded that incision should be performed in any infection of forty-eight hours' duration if severe pain has been present for twenty-four hours or if the tension is high. It is unwise to wait for definite indications of the presence of pus.

Seven different methods of treatment were employed in comparable cases and the following conclusions were drawn: (i) Early infections with low tissue tension respond well to the systemic administration of penicillin; but once moderate tension has developed, penicillin is ineffective. (ii) The most effective method of treatment is incision, excision of necrotic tissue when present, immediate suture of the wound, and the administration of penicillin systemically. When this method of treatment is employed, the average healing time of uncomplicated infections of any nature is eight days. When all cases are included, the healing time of pulp space infections is 11.2 days, of subcutaneous infection 9.1 days, of paronychia 9.2 days, and of web space infections 9.3 days.

Twenty-six cases of suppurative teno-synovitis are reviewed. The most effective treatment is irrigation of the sheath with penicillin, through proximal and distal incisions. Good results also follow complete excision of the sheath with primary closure of the skin incision, and the systemic administration of penicillin. The healing times with these methods are 8.8 days and 10.0 days respectively. Return of function is full, or nearly full, in each instance.

#### Acknowledgements.

I wish to acknowledge my debt of gratitude to Dr. A. D. D. Pye, the General Medical Superintendent of the Brisbane General Hospital, for his cooperation and assistance in establishing a special hand unit within the hospital; to the senior resident medical officers of the hospital, who performed much of the operative work; and to Professor N. G. Sutton for his assistance in the preparation of this paper.

#### Reference.

Florey, M. E., and Williams, R. E. O. (1944), "Hand Infections Treated with Penicillin", *The Lancet*, Volume I, page 73.

## Reviews.

### DIFFERENTIAL DIAGNOSIS.

ANY author who undertakes to write a book on differential diagnosis sets himself a Herculean task, for he perforce must embrace the whole range of medicine and surgery with their ancillary specialties. Thus he runs the risk of foundering on the Scylla of tedious verbosity or the Charybdis of misleading brevity, and in attempting to sail between these dangers his work may deteriorate into a series of tabulations.

Julius Bauer in "Differential Diagnosis of Internal Diseases" largely avoids these pitfalls and has produced a work which is both readable and informative. It is divided into two parts, the first dealing with leading symptoms and the second with leading signs. The value of the work is greatly enhanced by the frequent use of illustrative cases which are well chosen and clearly presented. An analysis of the author's last 2000 cases showed that 33% had to be diagnosed as pure neurosis or psychoneurosis of one type or another, an experience which tallies with our own, and so throughout the work the correct stress is laid on these conditions when the author is considering the differential diagnosis of symptoms ranging from headache to diarrhoea. In a book of this nature a certain amount of repetition is inevitable, but the author in general avoids becoming tedious. The correct emphasis is placed on the value of a careful history, but one cannot agree that the excruciating pain which accompanies rupture of the aortic wall (dissecting aneurysm) cannot be distinguished from anginal pain as far as its quality and localization in the chest are concerned, nor does one believe that the term "angina" is derived from the Latin "angor" meaning anxiety. The usefulness of the book is enhanced by a summary and a bibliography at the end of each chapter and altogether it is probably one of the best works of its kind.

Another American contribution to the literature on diagnosis is "Medical Diagnosis" by 23 authors edited by Roscoe L. Pullen.<sup>2</sup> It is intended for the medical student and covers the whole range of physical examination and many ancillary methods. In fact it might be said to finish where the above-mentioned book on differential diagnosis begins. The subject matter is well presented, fairly exhaustive and up to date, such modern aids as electrocardiography, electroencephalography and certain biochemical investigations being accorded their due place. A good sense of balance is displayed throughout the book and one would endorse the author's remarks that the tendency of certain enthusiasts and many young and unwary physicians to abandon a careful physical examination of the chest in favour of Röntgenograms must be resisted. Illustrations are freely used to the number of 600, and for the most part are well chosen, though a lateral radiographic view of the chest instead of the antero-posterior one presented would have been better to illustrate mediastinal emphysema. This is a very creditable work.

### MODERN ABNORMAL PSYCHOLOGY.

"MODERN ABNORMAL PSYCHOLOGY" is a symposium edited by W. H. Mikesell, who writes the pages on maladjustment.<sup>3</sup> No less than twenty-four leading American psychologists and psychiatrists contribute sections. With such a galaxy of talent there is an occasional difference in viewpoint. This is inevitable and does not detract from the value of the book. The individual approach is both stimulating and informative. The contributors have been well chosen.

<sup>1</sup> "Differential Diagnosis of Internal Diseases: Clinical Analysis and Synthesis of Symptoms and Signs", by Julius Bauer, M.D., F.A.C.P.; 1950. New York: Grune and Stratton, Incorporated. 9" x 6½", pp. 888, with many illustrations. Price \$12.00.

<sup>2</sup> "Medical Diagnosis: Applied Physical Diagnosis", edited by R. L. Pullen, M.D., F.A.C.P.; Second Edition; 1950. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9½" x 6½", pp. 1138, with many illustrations, some of them in colour. Price: £5 18s. 9d.

<sup>3</sup> "Modern Abnormal Psychology", edited by W. H. Mikesell; 1950. New York: Philosophical Library, Incorporated. 9" x 6", pp. 896. Price: \$10.00.

Space will not permit an adequate summary of the very diverse sections, which range from the history of psychology, the cause of mental disease and the defence mechanisms to neurotic reactions in World War II, manic depressive psychoses, drugs, psychosomatic medicine and psychiatric treatment. The concluding chapter is aptly "Mental Hygiene and the Future".

The changing viewpoint is shown in Mikesell's discussion of the "instincts". He points out that whereas they were at one time considered all-important in psychopathology, Watson and the behaviourists reduced them to the status of mere conditioned reflexes. Now with the swing of the pendulum they are returning in the guise of social drives.

Aggression receives close attention. Aggressive tendencies are found in hypertensives, sufferers from coronary disease and pseudo angina. Emily L. Stoddill has an interesting chapter on withdrawal as part of the defence mechanism and discusses the treatment of a patient withdrawn from reality.

Legal and scientific concepts of mental illness are dealt with by Glenn D. Higginson. He discusses the psychology of the judge, the juror and the witness, pointing out the important part which emotion plays in their decision. He pleads for the recognition of the need for a more scientific approach to the problem of ascertaining correct evidence. There are records of the official use of the "Lie Detector".

The chapter on "Abnormalities of Intellect" includes an outline of modern tests such as the Bellevue, Wechsler and Rorschach, which makes interesting reading.

The general reader will find relaxation in the chapter on "Mania-Depression of Famous Men". The lives of Beethoven, Tolstoy, Tchaikovsky and Dickens are contrasted against a common background of the manic-depressive constitution.

Dealing with schizophrenia, Lazell emphasizes the importance of fear. As the emotions are ambivalent the repression of love results in the freeing of fear. Consciousness is constricted, the present is lost, to be replaced by an ecstasy of the future. He indicates that the framework of the schizophrenic syndrome is laid down in childhood.

The chapter on "Psychosomatic Medicine" deals with the historical angle. He points out the enormous importance of the emotions, but does not consider that psychosomatic medicine is a new specialty. It is rather a "deepening and extension of both medicine and psychiatry with increased burdens on both; more psychopathology must be learned by the physician, and more medicine by the psychiatrist".

The practising psychiatrist and physician will turn with interest to the chapter on "Psychiatric Treatment" by John M. Lyon. He gives the life story of a difficult patient and step by step outlines the type of therapeutic interview which led to her recovery. Not the least of means to this desirable end is the ability to listen and the timing and thoroughness of the physical examination. He summarizes the portion thus: "Psychotherapy is certainly an art, but it is an art that is based on sound scientific training. No one can hope to do psychiatric treatment without knowledge of personality formation and development or without training in psychopathology. The days of fatherly advice and stern admonitions are long since past and may they never return as methods of helping people with psychiatric problems."

In conclusion, "Modern Abnormal Psychology" is a work of reference which should be widely read by those who wish to know the modern viewpoint on the integration of mind and body in a "total concept".

### THE TREATMENT OF DIABETES.

DR. A. R. COLWELL points out that all disorders encountered in clinical practice which are suspected of being or known to be diabetic may be subdivided into four main groups—unproved diabetes, mild diabetes, severe diabetes, and acute complications. This subdivision is the basis of a monograph which he has produced on "Types of Diabetes Mellitus and Their Treatment", and it appears greatly to simplify the exposition of the subject.<sup>1</sup> For mild diabetes, desugarization (what a word!) by diet is recommended. In the author's belief the only efficient diet prescription is one which specifies which foods can be used and how much of

<sup>1</sup> "Types of Diabetes Mellitus and Their Treatment", by A. R. Colwell, M.D.; 1950. Illinois: Charles C. Thomas—Publisher. Toronto: The Ryerson Press. Oxford: Blackwell Scientific Publications, Limited. 8½" x 5½", pp. 112, with some illustrations. Price: 16s. 6d.



each of them is allowed: he goes on to state that "this is best accomplished by employment of a diet weighed by the metric system"; that prescription of a weighed diet demands a system of printed forms; and that each diabetic diet prescribed involves decisions regarding the Calories, the protein and the carbohydrate-to-fat ratio of the diet, which factors will vary with the age, sex, occupation, and state of nutrition of the patient and the severity of his diabetes. The book describes in detail along these lines the methods of determining the patient's food requirements. In the section on severe diabetes there is a very good comparison of the different kinds of insulin and insulin mixtures and their uses. In the final section on emergency treatment, the subject is dealt with from a severely practical standpoint. The book, which is printed in clear type on good paper and bound in a limp cover, is one of an endocrinological series.

#### PROGRESS IN CLINICAL ENDOCRINOLOGY.

It is most difficult even for the specialist in endocrinology to keep abreast of the rapid advances in that subject, but for the physician, surgeon and general practitioner it is an impossible task. With the object of assisting those members of the medical profession who take a special interest in diseases and disorders of the endocrine glands to assess the value of new work on the subject, a summary and a critical review of the progress in each phase of endocrinology have been prepared by an impressive array of authorities under the editorship of Dr. Samuel Soskin and published in a volume entitled "Progress in Clinical Endocrinology".<sup>1</sup>

The book consists of twelve sections. After an introduction dealing with the role of hormones in metabolism and the endocrine regulation of protein metabolism, the next nine sections are devoted to a study of the problems associated with the diagnosis and treatment of the diseases and disorders of the various ductless glands. The penultimate section is devoted to a discussion of the use of hormones in non-endocrine conditions, and finally there is a review of general endocrine topics in which there is an interesting summary of modern views with regard to the relationship of the endocrine glands to obesity.

The book should prove of great value to both the laboratory worker and the clinician. The subjects chosen include many matters about which a perplexed medical practitioner frequently requires authoritative opinions. As examples, we may quote the relationship of nodular goitre to carcinoma of the thyroid gland, the clinical use of anti-thyroid drugs, the 17-ketosteroids in human urine, pheochromocytoma, the treatment of *diabetes mellitus*, the attempted induction of ovulation and Simmonds's disease.

In conclusion, in our opinion this volume should prove a most useful addition to any doctor's library.

#### DIBLE AND DAVIE'S PATHOLOGY.

IN 1939 appeared a new text-book of pathology prepared more particularly for the use of students. The second edition was reviewed in these pages in 1945, and now, eleven years after the book first appeared, a new edition of "Dible and Davie's Pathology: An Introduction to Medicine and Surgery" has been called for.<sup>2</sup> We are not surprised at such a demand by students and their teachers and by general practitioners, for we have found this work of over 900 pages of text and illustrated with 417 figures well suited to give a comprehensive and sound description of pathological conditions and their significance.

Owing to Professor T. B. Davie's having been called to a high administrative office in his old University of the Cape, and his removal from active pathological work, the whole task of revision has fallen on the senior author. The five years that have elapsed since the second edition appeared

have seen important advances in our knowledge of disease, necessitating, as Professor Dible tells us in his preface, rewriting much of the contents and extensively altering large sections.

In the opening chapter on "What is Pathology?" we are glad to see quoted Occam's "*Entia non sunt multiplicanda prater necessitatem*". If two or more pathological conditions are present in the one patient they may be related to each other as part of a single entity; they should be relegated to entirely separate causes only when no reasonable association between them can be seen. Even then, if the conditions are unusual, it may be wise to hold them in a suspense account. Emphasis is also laid in this chapter on the advice of a great Scotch teacher: "Always follow your patient to the post-mortem room." No one can be a really great physician or surgeon who has not seen and studied at least a thousand autopsies—not that the road to greatness lies in the mortality of one's own patients.

This text-book, being for the student, undergraduate or post-graduate, does not attempt to cover all the pathological conditions that are known. It does, however, cover a wide field and rarer conditions are shortly epitomized, so that the reader gets a very good general idea of pathological processes, and their implications, and is not unduly sidetracked over rarities. There is still much controversy over many problems, and Professor Dible has given in such cases summaries that appeal to us as being sound. An instance in point is Chapter IX on "The Essential Nature of Tumours". There are four chapters on "The Pathology of Growth", two on "Immunity". Next follow chapters on the pathology of the infections, one dealing with acute rheumatism. Nearly 500 pages describe regional pathology, and parasitic diseases occupy thirty-one.

We can again heartily recommend this text-book to the student and to the practitioner who wishes to bring his general pathological knowledge up to date.

#### A YEAR BOOK OF DRUG THERAPY.

IN "The 1950 Year Book of Drug Therapy" the editor, Harry Beckman, reinforces the favourable impression created by the previous volume, which was the first of this particular section of the Practical Medicine Series of Year Books.<sup>1</sup> Following the pattern of all the 1950 Year Books, he opens the volume with an account of advances in drug therapy during the period from 1940 to 1950. This shows strikingly the major progress made in this field in recent years, and particularly the many notable additions to the previously small list of drugs that could be regarded as providing specific rational therapy. Because of these facts this particular Year Book is likely to be one of the most generally acceptable and important of the series. Its editor, drawing from journals received between October, 1949, and September, 1950, has provided, with discrimination, a wide range of material. His editorial comments are never long, but they are carefully critical, informative and occasionally pungent. The material is grouped into chapters relating to the main sections of medical practice. A short chapter on allergy, dealing mainly with the antihistamines and ACTH, is followed by a lengthy treatment of cardiovascular disease, divided into sections on arrhythmias, cerebral vascular episodes, congestive heart failure (mostly concerned with digitalis and mercurial diuretics), coronary disease, endocarditis, hypertension, peripheral vascular disturbances, and thrombosis and embolism. ACTH and cortisone have a prominent place in the chapter on dermatology, with antihistamines, antibiotics and anti-parasitic preparations, and they dominate the chapter on endocrinology. Short chapters follow on gastro-enterology and haematology. The main chapter in the volume, that on internal medicine, has sections on *diabetes mellitus*, fever, infectious disease (bacterial, helminthic, mycotic, protozoal, rickettsial and viral—each treated separately), liver disease, neoplastic diseases, nephritis, obesity, pain, poisoning, rheumatic disorders and thyroid disturbances. The remaining chapters relate to neuropsychiatry, obstetrics and gynaecology, ophthalmology, oto-rhino-laryngology, paediatrics, Röntgenology, surgical specialties and venereal diseases. There is something for everybody in this volume, which should commend itself not only for browsing and study, but for constant reference. Its binding is particularly attractive.

<sup>1</sup>"The 1950 Year Book of Drug Therapy (October, 1949–September, 1950)", edited by Harry Beckman, M.D.: 1951. Chicago: The Year Book Publishers, Incorporated. 7" x 5", pp. 578, with many illustrations. Price: \$5.00.

<sup>1</sup>"Progress in Clinical Endocrinology", edited by Samuel Soskin, M.D.: 1950. New York: Grune and Stratton, Incorporated. 9" x 6", pp. 658, with a few illustrations. Price: \$10.00.

<sup>2</sup>"Dible and Davie's Pathology: An Introduction to Medicine and Surgery", by J. Henry Dible, M.B. (Glasgow), F.R.C.P. (London); Third Edition: 1950. London: J. and A. Churchill, Limited. 9½" x 6½", pp. 980, with 417 illustrations, including nine plates in colour. Price: 54s.



# The Medical Journal of Australia

SATURDAY, APRIL 28, 1951.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

## INDUSTRIAL HEALTH SERVICES.

THE subject of health in industry has been discussed in these columns on many occasions, and an attempt has been made to bring to medical practitioners some realization of its range and value. It is true, however, that, though something has been done here and there, those who participate in industry have not become really alive to its importance. In 1943 a conference was called by the Factory and Welfare Department of the Ministry of Labour and National Service of Great Britain, and the report was discussed in this journal on March 25, 1944. A second conference was held at the London School of Hygiene and Tropical Medicine in September, 1944; this report was discussed in the issue of May 26, 1945. Perusal of both these reports shows that those who spoke pursued the subject with what may be described as missionary zeal—there were people who had to be convinced that the practice of industrial hygiene was necessary to health and beneficial to industry. At the first conference a shop steward described himself as the only person to speak who was actually one of those around whom the discussion had centred—he was an industrial worker, an engineer who worked on a lathe. He stated quite rightly that if cooperation between the Government, the employers and the workers was needed, then all the parties concerned should be able to discuss it. He was shocked to hear that the body responsible for the conference had been in existence for over 100 years, because the conference was the first that had ever been held. This happened only a few years ago. Such rapid advances have been made that on June 1, 1949, the Prime Minister, the Right Honourable C. R. Attlee, announced to the House of Commons that he had appointed a committee of inquiry with the following terms of reference: "To examine the relationship including any possibility of overlapping between the preventive and curative health services provided for the population at large and the industrial health services which make a call on medical man-power (doctors, nurses and auxiliary personnel); to consider what measures should be taken by the Government and the other parties concerned to ensure that such medical man-power is used to the best advantage; and to make recom-

mendations." The chairman was His Honour Judge E. T. Dale. The members included the chief medical officer of an industrial firm, a member of the Electrical Trades Union, two trained nurses, one of whom was attached to an industrial undertaking, the founder of the Industrial Welfare Society, the chairman of a regional hospital board (not a medical man), a former chairman of the Trades Union Congress General Council, the works director of a large commercial firm, a member of the National Coal Board and two medical practitioners. There are aspects of this report with which we in Australia need not concern ourselves; attention will therefore be directed towards certain aspects of it.

In Great Britain 239 medical practitioners are engaged in factory medical services on a whole-time basis. Including the full-time personnel, there are 1789 "appointed factory doctors" and 1287 other doctors "not appointed". Those doing part-time factory work serve for periods varying from "more than 12 hours a week on the average" to three hours or less a week. Those working for three hours or less in factories are the "occasional" group, and in the two categories of "appointed" and "not appointed" officers the numbers are 1397 and 584. At December 31, 1949, there were in the general health services of Great Britain 10,417 medical practitioners engaged in hospital and specialist services, 21,062 in general practitioner services and 2266 in local authority services. Another fact to be noted is that of the great majority of some 240,000 factories no less than 221,000 employ less than 50 workers and of these 203,000 employ less than 25. All these factories are obliged by law to maintain certain standards of factory environment, and if they employ people in certain processes with special hazards, or if they employ young persons, are required to consult the "appointed factory doctor". With these figures before us and bearing in mind the newness and the extent of the present national health service in Great Britain, we can well understand that the Prime Minister wished to be certain that no overlapping or reduplication was taking place, in other words, that no wastage of medical manpower was occurring. This brings us to the first conclusion which we may draw from this report—it is not new but needs to be proclaimed and the opportunity to proclaim it arises with this report. It is that the general health service (the general practitioner service), the public health service and industrial health services are essential parts of the medical service of a community. The authors of this report express the same idea by stating that existing industrial health services are complementary to the National Health Service. Obviously there will be agreement with the statement that what we have called the three essential parts of the medical service should be coordinated. In Britain it is suggested that experiment is needed to determine what is the most suitable and economical form of service for the small factory. This should be done also for Australia.

Let us look next at those who carry on the industrial health services—the doctors and nurses. The functions of each are, or should be, well known to all medical practitioners. The functions of an industrial medical officer are set out in the report under four headings: (a) general advisory services to the management on matters of hygiene and conditions of work (eight subjects are named); (b) examination of individual workers

with a view to advising the management on conditions of employment; (c) therapeutic services; (d) certain general health services to workers. It should be noted that the therapeutic services include the supervision of nursing services and the supervision of first aid. The fact should be emphasized that these functions of an industrial medical officer are the backbone of industrial medical services and that they can be rendered by no one but a trained medical practitioner. The committee states that an industrial medical officer must be a sound clinician. It seems unnecessary for it to explain that industrial health services "are indeed not wholly medical in character, but they are bound up with the carrying out of certain functions, largely non-medical, at the place of work". It is the non-medical functions which the sound clinician has to study that he may understand the worker's milieu and the demands likely to be made upon him. This is true of any medical service, even that of the general practitioner, who has to be prepared to form an estimate of the type of work done by a patient and his ability to do it.

The functions of an industrial nurse vary, as do those of the medical officer, with the size of the establishment in which she is employed and its nature. These need not be enumerated, but it may be useful to draw attention to "the value of the nurse in raising and maintaining the morale of the workers" in an establishment. Though a nurse will to a certain degree reflect the attitude of the medical officer, she can and does create her own atmosphere. She can do this, as we all know, in a hospital ward; in a factory she has not the same opportunity, but she can make her presence felt in a surprising fashion. That there is a shortage of nurses in Britain is shown by the fact that some 42,000 beds are still out of use, chiefly because nurses are not to be had. The needs of industrial health services are just another reason why greater efforts should be made to solve the problem of scarcity of recruits to the nursing profession—in Australia as well as in England.

With the Dale Report as a basis we have done little more than direct attention to the subject. Because medical practitioners are appointed from time to time to be medical officers of industrial undertakings, it would be easy to assume that those connected with industry and those who legislate for the community are seized with the essential value of industrial health services. As a matter of fact this is far from true. Far too many employers look on an industrial medical officer as a man who may promote efficiency in a staff and so increase production and do nothing more. It is true that both these things are done, but they are incidental to what the medical officer can and should do. It would be much better if industrial medical practice was known as medical practice in industry. The former term may be taken by some persons as implying that the medical officer is little more than one who attends to workers who sustain minor injuries and perhaps tries to prevent them. To talk of medical practice in industry implies what the words indicate—that medical practice is carried on in the field of industry, that workers are to be kept well because they are human beings, men and women liable to suffer from illness of all kinds and perhaps likely to be affected by the type of work they do and by their environment while they do it. We remember that the recent British report

emphasizes the point that an industrial medical officer must be a sound clinician. Incidentally it should be noted that medical practitioners generally should recognize that with medical practice in industry the industrial medical officer is something more than a glorified casualty officer, for that is unfortunately how many general practitioners regard him. We have stated that a general health service, public health services and industrial health services are essential parts of the medical service of a community; it follows that those who take part in these services are practitioners of equal status. When this is recognized then workers in industry will cooperate and will not, as some tend to do, look with suspicion on the doctor in industry.

## Current Comment.

### THE PREVENTION OF MOTION SICKNESS.

WAR EXPERIENCE in motion sickness has conferred some benefit on civilians, partly through observation made on well-known drugs and partly through application of new synthetic preparations for this purpose. The Navy and the Air Force have been practically interested, but perhaps the Army has been set one of the most difficult problems by the growing importance of combined operations. Major H. I. Chinn, W. K. Noell and Lieutenant-Colonel P. K. Smith have published an article which deals with the question of motion sickness from one practical aspect, that of the value of antihistaminic drugs.<sup>1</sup> They point out at the outset that the response to a pattern of afferent impulses from the vestibular mechanism through the cerebellum to the brain stem requires a fairly long process of summation before the familiar series of symptoms are evoked. Adaptation may occur after what they term a "relatively rapid process", though many of the victims of motion sickness would look askance at the optimism of this description. During the 1939-1945 war the members of the atropine series were found to have the greatest value, in particular hyoscine. In the last few years, however, certain groups of drugs have been produced which are of great use in allergies by reason of their histamine antagonism, and trial of these in motion sickness has been encouraging. Therefore these authors set out to discover if the efficacy of these drugs against motion sickness was related to an antihistaminic effect, whether they were really more effective than hyoscine, and whether such an inquiry would provide a method of preliminary selection of remedies before they tried them at sea or in the air. They felt that the usefulness of certain drugs in motion sickness and parkinsonism suggested a common action which was possibly anticholinergic. They selected a number of drugs for trial which have been employed with benefit in parkinsonism, an antispasmodic, and one which was strongly antihistaminic but only slightly anticholinergic ("Neo-antergan"). Those in the previous categories were "Benadryl", "Dramamine", "Thephorin" and "Artane". In addition "Perazil" was included because of its reputed freedom from side effects and its long duration of action. Experimental studies were carried out on a transport crossing from New York and return. Volunteers were chosen and placed in all the compartments of the ship on the same deck. A full history of previous adventures at sea and in the air was obtained from each volunteer. The various drugs were administered under supervision to members of a number of groups. Those in one group received a placebo, which with each of the chosen drugs was enclosed in a capsule identical in appearance. There were, of course, differences in the weather at different times, and on the outward and inward journeys, and the degrees of experience in travel varied

<sup>1</sup> Archives of Internal Medicine, December, 1950.

also. The authors found it difficult to estimate the significance of the side effects, such as drowsiness, headache or dizziness. There seemed to be no difference in the degree of drowsiness regardless of the drug used, even with a preparation which has some stimulating properties, though the slight central depression caused by most of these drugs was probably the cause. Slightly blurred vision was not uncommon with hyoscine. Critical review of the results of nearly 1000 men gave the following results. The capacity of a drug to prevent travel sickness does not seem to be related to its antihistaminic action. Some of the drugs with a strong action of this kind had no value in motion sickness. The authors suggest that the anticholinergic action of some preparations may partly explain their effectiveness. Diphenhydramines such as "Benadryl" and "Dramamine" were the drugs of choice; the antispasmodic tested was comparable with hyoscine, but had the same side effects of dryness of the mouth *et cetera*. Chlorcyclizine and "Perazil" also gave useful protection. The curative action of any of these drugs was hard to assess, as adaptation was so variable a phenomenon. It was interesting that despite increase in the turbulence of the weather few men took the drug on trial for the whole voyage.

Encephalographic studies were also carried out on the ship. These showed that in the early stages of severe motion sickness cortical rhythms were not disturbed to a degree that was clinically significant, but there was an activation of the  $\alpha$  rhythm and a slowing of the dominant wave frequency. This did not seem to indicate more than a concordance with a clinical state of slight drowsiness. At present there would seem to be two pharmacological paths which we may pursue in trying to counteract motion sickness with drugs of specific type.

#### CANCER AND AGING.

In his now well-known book "Pathology of Tumours", which was published in 1948, R. A. Willis has devoted a chapter to a careful discussion of the statistical study of tumours. This chapter will repay careful reading by any who set out to present papers on neoplasms. Willis has formulated certain general rules relating to the degree of reliability of cancer statistics of various kinds, the chief of which have to do with the degree of accuracy of diagnosis and the degree to which the sample is adequate both in numbers and in representation. In presenting a survey of autopsy records from hospitals in St. Louis, John A. Saxton, Fred P. Handler and John Bauer<sup>1</sup> have quoted Willis and have set themselves to observe, so far as is practicable, his ideal criteria. Their basic material was the autopsy records of 12,443 white persons coming to autopsy in the municipal and State hospitals of St. Louis during the fifteen years prior to their survey, that is, from July 4, 1935, to July 4, 1950. Their aim was to determine the incidence of cancers in relation to age in both sexes, and to observe any changes in incidence within the fifteen-year period. The age distribution in the cases surveyed was closely parallel to that relating to the total reported mortality of the community; about 9% of deaths in the community were included in the survey. Diagnosis in all cases was based on study of microscopic sections. The 12,443 autopsy records revealed that a total of 2322 patients, or nearly one-fifth (18.7%) of those examined, regardless of age, bore cancers. The incidence of cancers increased from 16.8% to 20.6% in the three five-year periods studied, and the increase could not entirely be accounted for by an observed shift in the distribution of cases towards a more advanced age. Saxton, Handler and Bauer conclude that cancer has increased slightly in incidence in St. Louis in the past fifteen years. The most common types of cancer were, in order of frequency, carcinoma of the following organs: large intestine (including rectum), lung, stomach, prostate, uterine cervix, breast, urinary bladder, oesophagus, pancreas and brain. Carcinomata of these 10 organs or

sites comprised 66% of the cancers, which were of 46 different types or sites of origin. Cancer of the large intestine maintained a clear lead over others in all three five-year periods. Increases in actual frequency over the fifteen-year period were noted in carcinoma of the lung, of the prostate and of the pancreas; decreases occurred in carcinoma of the urinary bladder and of the oesophagus. The most conspicuous increase occurred in cancer of the lung, a finding in conformity with the reports of many other investigators. An interesting finding emerges from examination of incidence in relation to advancing age. As might be generally expected, the incidence of all types of cancer increased with advancing age into the seventh decade of life; but with the exception of elderly male subjects, in whom the incidence of carcinoma of the prostate continued to increase, there was a decrease in incidence beyond this age. It is concluded that, except for cancer of the prostate, the incidence of malignant neoplastic disease does not increase directly and indefinitely as a function of age, and that after the seventh decade of life there is perhaps a lessened chance of bearing a cancer. However, Saxton, Handler and Bauer state, their evidence would not support the statement that if a person lived long enough he would not have a cancer. In the matter of age incidence each type of cancer exhibited a characteristic pattern; the ages of highest frequency were as follows: for carcinoma of the large intestine, eighth decade; of the lung, sixth decade; of the stomach, eighth decade; of the prostate, tenth decade; of the *cervix uteri*, fifth decade; of the breast, seventh decade; of the urinary bladder, seventh decade; of the oesophagus, seventh decade. The incidence of multiple primary cancers was 85 in 2322 cancer-bearing subjects (3.7%). This incidence is stated to be in agreement with observations of others that multiple primary cancers occur more often than can be accounted for by chance. The frequency of multiple cancers increased with advancing age into the ninth decade of life. However, from the evidence of this and other surveys, it cannot be stated that the frequency of multiple primary cancers increases indefinitely as a function of age; available data reveal no case of multiple primary cancer in the tenth decade. All these findings are of interest—we could well have more surveys of similar type—and in general an attempt has been made to analyse the data critically. It may be noted, however, that despite general adherence to Willis's criteria, these investigators have used the term "cancer", which Willis views with disfavour, defining it as an ill-defined heterogeneous group of diseases. Fortunately only a few generalizations about "cancer" are made by them; most of their findings are presented, primarily at least, in terms of types of tumours of specific organs or sites and can thus warrant more precise examination.

#### THE RADIOTHERAPY OF ORAL CANCER.

In 1938 the Medical Research Council published a report on the progress and results of the Radium Beam Therapy Research Unit.<sup>1</sup> This report described in detail the clinical methods and physical procedures which had been developed in the administration of radium beams emanating from quantities of radium of the order of four to five grammes. The results which were recorded in themselves were not such as would justify the assumption that all cases of buccal, pharyngeal or laryngeal cancer should be treated electively by radium beam therapy. The striking feature of the work was the degree of cooperation which had been achieved between the clinicians and the physicists. The treatment planning and the dose calculations were matched by the meticulous attention to detail at all stages of administration of treatment to the patient. Radiotherapists have long argued the question whether  $\gamma$  rays of radium have any "specific" action not possessed

<sup>1</sup> "Report on Radium Beam Therapy Research", by C. A. P. Wood, L. G. Grimmer, T. A. Green and others; 1938. Medical Research Council of the Privy Council, Special Report Series, Number 231. London: His Majesty's Stationery Office.

<sup>2</sup> A.M.A. Archives of Pathology, December, 1950.



by X-ray beams. Experienced clinicians have held that radium caused different reactions of a lesser degree than X rays, and that the tumours in general "responded better". Such assertions seemed very difficult to prove on account of the great number of other physical variables affecting the distribution of radiant X-ray or  $\gamma$ -ray energy in tissues. X-ray therapy machines were located in all centres, but in general facilities for controlled beam directional work under physical control were lacking everywhere. Whether similar results could be obtained with X-ray beams when the accessory physical services were added was the question generally raised after publication of the radium beam therapy report. This question has been answered, but answered in part only, by a new report from the original unit now renamed the Medical Research Council's Radiotherapeutic Research Unit operating at Hammersmith.<sup>1</sup>

The workers have set out to compare and to contrast the effects of radium and X-ray beams applied as nearly as possible under strictly comparable conditions to the treatment of similar types of oral cancer. The test beams were constructed so that similar distributions of energy occurred in the tissues from each beam. The radium beams are of low energy as compared with the X-ray beams, even when amounts of five or ten grammes are used, and so focal skin distances of the order of eight centimetres are essential. Deep X-ray beams are routinely used at focal skin distances of from 40 to 70 centimetres, and as the percentage depth dose increases with focal skin distance, focal skin distances of the order of 50 centimetres are regarded as optimum for general clinical practice. To match the X-ray beam to the radium beam very different physical conditions were adopted from those in use on X-ray therapy machines in routine work. A voltage of 185 kilovolts with added filtration of 1.52 millimetres of tin plus 0.2 millimetre of copper plus 26.5 millimetres of aluminium was used at 15 centimetres' focal skin distance. The two beams then were of practically equal energy distribution in tissue and differed only in the quality of the radiation. The dosage rate from each was equal. The effective wave-length of the beams used was therefore the only experimental variable employed.

Patients as accepted were treated in equal numbers by each method without discrimination. No patient was refused treatment no matter how advanced the condition, though "second-hand" cases were not accepted. Treatment was wholly by irradiation, and no patient was submitted even for surgery of gland fields. Radiotherapist and physicist set out to deliver an adequate and uniform dose of radiation throughout the whole cancer-bearing area, that is, to the primary growth as well as to glands involved or likely to be involved. The relatively low depth dose from the radiation beams employed made cross-firing techniques essential. Much physical planning was carried out to see that uniformity was obtained where required, and that spots of high or low dosage were avoided. Standard field arrangements were determined for most sites treated. The reader of this latest report again has his admiration stirred by the painstaking work which has gone into the planning, the calculating, and the administration of the required treatment.

A sufficient number of patients have been treated to allow statistical comparison of the radium and the X-ray results. Final figures show that 28% of all patients treated with the radium beam are alive and well four and a half years after treatment, and that 20% of patients similarly treated with X-ray therapy are well. Statistical analysis shows that the 8% difference in the four and a half year survival rate is only 1.3 times the standard error and is therefore regarded as not significant. A new statistical method has been developed which allows estimated cure rate at the five-year stage to be determined from progress figures. Application of the method to the above figures gives an estimated five-year cure rate of 31% for the radium treated patients and 19.2% for the X-ray

therapy group. These differences are not regarded as significant by the authors, and it is concluded that neither method is superior to the other in regard to the ultimate results of cure rate obtainable. However, several significant differences between the two methods were brought out during the experiment. Standard dosage at the tumour site was 6000r in forty-two days, treatment being given six days per week to at least two fields per day. In general, X-ray reactions appeared earlier and were of greater severity on both skin and mucous membrane, so that average tumour doses from X-ray therapy had to be reduced to 5500r as compared with average doses delivered from radium beam at 6200r. To prove this point a few individual patients with central lesions were treated with X-ray therapy from one side and radium beam from the other, and it was determined that the radium tolerance was 1.34 times that of the X-ray tolerance.

The authors regard skin reactions as due to the amount of energy absorption at a level immediately below the surface of the epidermis. The high energy radium beam produces relatively more "forward" scattering than the X-ray beam, and the higher proportionate amount of back scattering is held to account for differing skin reactions.

Glucksman and Spear investigated the histological responses of tissues under irradiation, and from their examinations they were able to make accurate prognoses of the results likely to be obtained.

An even more striking result of this investigation was the discovery that near actual sites of frank malignant disease there existed areas showing precancerous changes. Repeated histological examination showed that the latter areas possessed a radiosensitivity entirely different from that of the original neoplasm and that such areas sometimes persisted after radiotherapy was administered to the adjacent primary lesion. Such areas accounted for one-third of the later recurrences in the region treated, and were in reality new lesions and not true recurrences. Every radiotherapist has seen these changes and has noted new lesions developing in tissue adjacent to radiation scars due to a primary treatment. On biological grounds, one wonders why a malignant breakdown, say of a tongue or a breast, is so often such a localized affair.

The latter part of the report comprises a statistical survey and analysis of the clinical material presented. A large number of clinical happenings have been submitted to statistical analysis. Features such as the prior duration of symptoms, if plotted, are found to range about an arithmetic mean with greatest numbers close on either side of the average and fewer cases on either side at longer intervals. So plotting gives a smoothly rising and falling curve of this feature, but if the distribution is plotted on "probability" ruled graph paper on one axis against time plotted on a logarithmic scale on the other axis, a straight line distribution is obtained. A distribution giving such a straight line plot is called "log-normal". Many of the clinical features of the investigation fall within this category.

In addition to the length of history, size of tumour at presentation and growth rate of tumours per month, the rate of response of tumours during treatment follows lognormal distribution. Examination of incidence of glandular involvement shows that in conditions of the pharynx there is an abnormally high incidence of secondary gland involvement and that in post-ericoid conditions the secondary gland involvement is abnormally low, but for other sites the average incidence is 60%.

Tumours varied tremendously in their initial response to treatment. The time the tumour takes to shrink to half-size, or one-eighth volume, while under treatment follows a lognormal distribution. But tumours of the larynx diminish more slowly, and tumours of the soft palate and tonsil generally respond more quickly than the average.

It is commonly stated that glands respond much less rapidly and less completely to radiation treatment than does the primary tumour. This analysis does not support such a contention. Response of tumour and response of glands were plotted together on one chart, and there were

<sup>1</sup> "Researches on the Radiotherapy of Oral Cancer", by C. A. P. Wood, J. W. Boag and others; 1950. Medical Research Council of the Privy Council, Special Report Series, Number 267. London: His Majesty's Stationery Office. Price: 12s. 6d.

as many cases in which the glands responded more rapidly than the primary tumour as cases in which the primary responded better than the metastases. In general, when the primary growth showed a slow response the glands followed suit. The survival time of patients ultimately succumbing to their disease follows a lognormal distribution. A comparison between figures for untreated and treated patients shows a longer survival rate for treated patients.

The authors discuss the future of radium beam therapy. Radioactive cobalt<sup>60</sup> has been widely advocated as a suitable radioactive source for beam therapy. The biological effect of any radiation is due to its ionizing effects. The density of ions along secondary electron tracks is greater with soft than with hard radiation. In the case of 200,000 volts compared with 2,000,000 volts, the ion density is eight times greater for the lower radiation. Increase from 2,000,000 to 20,000,000 volts decreases the ion densities by only half. The authors suggest that as the present investigations in comparing the results of X-ray therapy at 200 kilovolts and  $\gamma$  radiation at the equivalent of 2,000,000 volts have shown little difference in cure rates, then little improvement is likely to be obtained by the use of higher voltages from the point of view of biological response. But questions of convenience of apparatus and depth dose distribution seem at present to favour the use of X-ray therapy apparatus in the range immediately above 2,000,000 volts. Consideration of therapy by electron beams seems impracticable because of the lack of edge definition due to scattering at the margins of the beams, and so narrow beam cross-fire techniques appear impracticable. The neutron beams produce recoil protons which have very high ion densities along their tracks, producing severe reactionary effects which for the present have limited their clinical usefulness. The desirable radiotherapeutic apparatus of the immediate foreseeable future is therefore likely to be one or other of the forms producing X-ray beams of energy in the 2 to 10 meV range.

Dr. Constance Wood and her colleagues are to be highly commended for the report which has been produced. The high standard of the work which has been carried out adds another laurel to British radiotherapeutic practice. Every radiotherapist will wish that this work should be continued, and would particularly welcome a comparison of the results already obtained with those likely to be obtainable from the use of X-ray beams of conventional energies, normal focal skin distances and qualities as used in ordinary practice, but with the added clinical and physical planning as developed for radium beam therapy at Hammersmith.

#### UNEXPLAINED RENAL HÆMATURIA.

For the urologist, according to J. A. Taylor,<sup>1</sup> unexplained renal hæmaturia is the most humbling diagnosis he is compelled to make. There is a small group of cases, he states, in which all that can be said is that the blood comes from one kidney; all the clinical and scientific findings are normal, including the excretion urograms and retrograde pyelograms. Groups of such cases have been reviewed in the past, but the urologist can expect to find them only in the proportion of about one in 500 urological cases. Taylor has five personal cases to report. He states that in general cases of unexplained renal hæmaturia can be divided into five groups. The first of these is associated with changes in the blood vessels, such as varices and angiomata, and the second with infections or inflammatory conditions, when the lesion may be chronic papillitis with or without ulceration, or early tuberculosis; early tuberculosis is included by Taylor in his second group, but it might be suggested that, being non-inflammatory, it could have a group to itself. The next group, those due to early carcinoma, can be expected to grow in importance with the use of the Papanicolaou type of smear examination, but Taylor stresses the fact that correct staining of the

smears and their right interpretation require great proficiency, and much care must be taken to obviate needless nephrectomies. Blood dyscrasias and abnormalities make up the fourth of Taylor's groups—one of his patients had a dangerous reduction in prothrombin activity without definite cause. The last group consists of the nephritides, in which one has particularly to think of toxic nephritis from chemical substances, for example, carbon tetrachloride; this substance seems to be a common offender and may, among other sources, be inhaled from certain floor cleansers and hair shampoos. The basis of management in these cases will naturally be treatment of the cause, if possible, but Taylor suggests that when the more serious causes are not considered likely, irrigation of the renal pelvis with 1% silver nitrate solution may be of use. Methylene blue also appears to help in the arrest of capillary bleeding, either given by mouth or instilled as a 2% solution. The mode of action of methylene blue is obscure, and its value is not universally accepted; but Taylor, impressed by practical experience, recommends it so firmly that it appears worthy of further trial.

SIR CHARLES MARTIN, C.M.G., F.R.S.

THE following communication has been received from Sir Percival Hartley, F.R.S.

On February 22, 1951, a copy of the Commonwealth Jubilee Number of *THE MEDICAL JOURNAL OF AUSTRALIA* appeared on the library table of the Lister Institute, and it was immediately obvious that of the many persons in England who would get entertainment and interest from the publication it would make a very special appeal to Sir Charles Martin. Thanks to the good offices of Mr. J. E. Cummins, of the Australian Scientific Liaison Office, it was possible to obtain one of the two spare copies of the Jubilee Number available in London, and this was sent at once to Sir Charles at his home in Old Chesterton, Cambridge. A reply was received about a week later and the following extract must be interesting to large numbers of the medical profession and other of Sir Charles's many friends in Australia.

I read with pleasure reminiscences of many old colleagues and co-operators in trying to build up a real scientific medical profession in Australia. The material was first rate. The quality of the medical student was superior to what I had been used to teach in London. They all meant business and the experimental method of approach came naturally to them and intellectual adventure was congenial. A drawback for the time being was that the best of them scorned research scholarships after graduation and came to Great Britain or the U.S.A. and were induced to stay. This drainage of some of the best talent was a menace to Australia.

Sir Charles's interest in Australia, and her sons and her affairs, remains unabated. From the beginning of the tenure of his office as Director of the Lister Institute of Preventive Medicine in 1903 there has been an unending stream of young Australian graduates to the Institute, which continued after his retirement, and at the present time four Australian graduates are engaged in research in the Institute. During the first World War Sir Charles had the very great pleasure and privilege of meeting many of his old friends and others of a younger generation of Australians in Egypt, Lemnos and Rouen. After his retirement in 1930, at the request of the Australian Government he investigated a number of problems concerned with the health and economy of Australia. In connexion with these investigations he revisited Australia and renewed his old friendships and made many new ones. During the second World War, the Lister Institute being most vulnerable to enemy attack, the important department of nutrition was transferred to Cambridge and Sir Charles's home became an active centre of research.

This is the jubilee year of Sir Charles's Fellowship of the Royal Society, an event which has brought much pleasure to his friends, who still find a quiet talk with him a most "congenial intellectual adventure".

<sup>1</sup> *The Journal of Urology*, June, 1950.

## Abstracts from Medical Literature.

### SURGERY.

#### Aortic Embolectomy.

M. R. EWING (*The British Journal of Surgery*, July, 1950) reports two cases of successful aortic embolectomy. The first of the patients concerned was still surviving sixteen months after the operation, but the second had died twelve months after the operation from a further embolism. The author's experience suggests that even in a severely affected cardiac cripple with signs of failure, operation may be quite worth while. He has been able to trace in the literature reports of 23 successful operations for saddle embolus.

#### Fibrosed Sterno-Mastoid Muscle in Infancy and Childhood.

J. B. BROWN AND F. McDOWELL (*Annals of Surgery*, May, 1950) advise the early excision of the sterno-mastoid muscle that has been replaced by scar tissue. The operation should be done before deformity becomes permanent with distortion of facial bones. Therefore, it is best done in babies. The stay in hospital is short, and no special post-operative care is necessary. The authors state that the pathogenesis is probably based on excessive stretching or tearing of the sterno-mastoid muscle during delivery, and many of the patients have a history of breech delivery. The authors find little evidence to support the theory of hematoma formation. The muscle may be completely replaced by scar and appear white on gross inspection. Sometimes there is a fusiform, swollen nodule of scar occupying the lower half of the muscle. Even though the upper part of the muscle may look grossly normal, microscopic sections stained to differentiate muscle and fibrous tissue will usually show the fibrous tissue to predominate. The method of the production of the facial asymmetry is described, and the decision is discussed as to when and in which cases operation should be performed. The technique of the operation is described: a short collar incision is made two inches above the clavicle, and dissection of the muscle is carried out with separation of both the lower and upper ends of the muscle. The eleventh cranial nerve is preserved. Any tight bands, either in the cervical fascia or within the scaleni muscles or the anterior border of the trapezius, are divided. No post-operative stretchings or exercises or appliances are used.

#### Pheochromocytoma.

E. C. BARTELS AND R. B. CATTELL (*Annals of Surgery*, June, 1950) present a study of pheochromocytoma with reports of four cases. They state that this tumour, though it is rare, does occur with sufficient frequency to warrant a suspicion of its presence in a patient having any type of vasomotor attacks or non-thyroid hypermetabolism or both. With the help of a few clinical studies the correct diagnosis may be found, and a carefully executed surgical procedure aided by one of the new adrenolytic drugs (dibenzamine-benzodioxan) will bring

about a cure. In all four cases reported the condition was diagnosed and the patient successfully treated. During the same period four post-operative fatalities occurred owing to unrecognized pheochromocytoma. The authors state that should a hypertensive reaction occur during the course of any operative procedure, it should lead to a suspicion of a pheochromocytoma. The symptoms are attacks or "spells" with vasomotor manifestations—palpitation, sweating, skin blotchiness. Hypertension, either sustained or fluctuant, is found, and the salient laboratory findings are elevation of the metabolic rate without goitre, abnormal pyelograms such as those of displaced kidney or calcification, and an elevated blood sugar level or a diabetic glucose tolerance test result. Certain incitatory substances, such as histamine, "Mecho-lyl" or "Etamon", are helpful in the making of the diagnosis. The tests, however, are not specific and must be carefully carried out for proper interpretation. The chief danger from surgical removal of a pheochromocytoma is a severe hypertensive reaction with subsequent acute left-sided heart failure. This danger can probably be avoided by using an adrenolytic agent during the operation. Removal of the tumour leads to a cure, unless the pheochromocytoma is malignant and leads to metastatic disease or has already produced serious vascular damage.

#### Operation Technique for Myelocoele and Meningomyelocoele.

WILLIAM R. CHAMBERS (*The American Journal of Surgery*, October, 1950) states that while the literature contains many excellent articles on the subject of *spina bifida* in infancy, particularly by Bucy, Ingraham and Vorhis, there is not available a complete and detailed description of the appropriate operation. The author selected 10 patients of the type that other authorities may have considered not suitable for surgery and early in their infancy (soon after birth) made the repair. He stresses the value of electrostimulation of all doubtful tissue in the sac in order to prove whether it is a nerve tissue or not and maintains that release of all fixating elements is imperative to permit of the upward migration of the spinal cord. Any such fixation left may be responsible for the formation of the Arnold-Chiari malformation at the base of the brain. The details of positioning, anaesthesia and technique are given, with the reports in the 10 cases. In seven the results were good; two patients died and one developed severe hydrocephalus. Of the seven patients for whom results were classified as good, two who had shown evidence of hydrocephalus appeared to have had the condition arrested after surgery, while one who had been able to move neither leg before operation could move these extremities well.

#### Pruritus Ani.

LAURENCE G. BODKIN AND EDGAR A. FERGUSON, JUNIOR (*The American Journal of Digestive Diseases*, February 1, 1951), have investigated the causes of itching and irritation in *pruritus ani*. Various experimental methods were used to induce the irritation. The authors state that most of the amino acids when applied to the perianal and perineal areas were found to be

beneficial. Some amino acids, notably methionine, were strongly irritating. An ointment containing amino acids which were beneficial in a vehicle of polyethylene glycol 1500 ("Carbowax") was used to test the clinical effect of amino acids on the symptoms of *pruritus ani*. In every case there was immediate relief, and in 88% of the cases in which the patients persisted in using the ointment for a period of two to three weeks there was complete healing. Investigation has shown that healing is due to prolonged protection from surface irritants. One hundred unselected patients obtained far better relief with this ointment than could be expected on the basis of history and previous treatment with any other agent in the same cases.

#### A New Surgical Treatment for Hirschsprung's Disease.

ORVAR SWENSON (*Surgery*, August, 1950) quotes the evidence to support the theory that Hirschsprung's disease is due to functional obstruction in the recto-sigmoid region which produces secondarily the hypertrophied and dilated colon. He states that the selection of patients with megacolon suitable for surgical correction depends on the demonstration of a narrowing of the recto-sigmoid by barium enema studies. Patients who have a colon dilated right down to the anus are not considered to have true Hirschsprung's disease and will not benefit from the removal of the recto-sigmoid and rectum. In his earlier cases the author performed a preliminary transverse colostomy, but as his experience has grown, he has come to perform fewer colostomies. For four weeks before his admission to hospital, the patient receives a low-residue diet, two ounces of mineral oil daily and one or two enemata a day; after admission colonic lavage is carried out three times a day. The operation involves a combined abdominal and perineal approach. A suprapubic incision to the left of the mid-line shows the transition from dilated to narrow colon. The proximal point of resection is at least 12 centimetres proximal to the point of narrowing to ensure removal of all the lesion, which is the absence of Auerbach's plexus. Colon proximal to the resection is freed so that it can be brought down to the perineum. The recto-sigmoid and the rectum are dissected down to the internal sphincter, care being taken to avoid injury to the bladder innervation. The bowel is divided between clamps at the previously selected point of resection and at the junction of the sigmoid and recto-sigmoid. One part of the operative team now dilates the anal sphincter and inserts a long clamp through the anus up to the closed end of the recto-sigmoid; this is pulled down through the anus, the bowel being turned inside out. This everted mucosa and the perineum are scrubbed with 1:1000 aqueous "Zephiran" solution. A cut is made half-way across the bowel two and a half centimetres from the cutaneous margin. A clamp is inserted through this opening into the pelvis, and the proximal segment is seized and drawn through. A two-layer anastomosis is now made, and it is allowed to retract through the anus. The pelvic floor is reconstructed and the abdominal wound closed. The management of the urinary bladder is the most important part of the post-operative regime; an inlying catheter is placed in free drainage for four days,



and tidal irrigation is then used until the tenth post-operative day, when the catheter is removed. Post-operatively the patients are given a regular diet with no laxatives or mineral oil. After discharge from hospital, diarrhoea of three to six weeks' duration occurs; then the patients settle down to one or two motions per day. The author has had only one failure in a group of 52 patients operated upon. He states that it is wise to avoid operating on infants under the age of six to eight months, because the typical lesion may not develop until then. There was one post-operative death in the series. The remaining patients have all been completely relieved of their complaints, the longest follow-up being nearly three years. They all have normal sphincter control, are receiving normal diets and have no mineral oil or other laxatives. They have one or two bowel movements each day, and have all gained weight and are in good general health.

#### Sarcoma Botryoides of the Genital Tract in Female Children.

RALPH SHACKMAN (*The British Journal of Surgery*, July, 1950) gives the details of what is known of the rather rare condition *sarcoma botryoides*. It is a malignant mesodermal tumour, like a bunch of grapes, which arises from the lower part of the female genital tract in adults and children. Microscopically it appears to be a rhabdomyosarcoma, and in its nature it is very malignant. Of the 54 children affected whose case records are available in the literature, only five appear to have survived for two years or more. Local recurrence generally follows local operation, while spread by metastasis is comparatively rare. The author undertook the treatment of a child of four years with such a condition by sacrificing the vulva, vagina, uterus, urethra and bladder together with the pubic ramus on the right side. This resection followed about one month after a bilateral uretero-colic transplantation. Two and a half years after the excision, the child appeared well and there was no persistence of the disease.

#### Intractable Ulcerative Colitis.

HARRY E. BACON AND HOWARD D. TRIMPI (*Surgery, Gynecology and Obstetrics*, October, 1950) state that no disease has defied all efforts of standardization as has idiopathic ulcerative colitis. Its aetiology is undetermined, its course unpredictable and its management without established rule. A significant number of patients with histories of repeated exacerbations and remissions are chronic invalids and human derelicts, kept alive or "controlled" by methods. These should have the benefit of early surgical supervision, and an intimate surgeon-patient relationship should be established. There can be no opiated tenets and no didacticism in dealing with this disease. Decisions are conditional and the management requires much of the art in healing. Ileostomy is not a curative procedure in itself and should be followed by colectomy. However, ileostomy in the acute, fulminating forms of the disease should not be entirely condemned, as it can prove to be a life-saving measure particularly when supported by blood transfusions and antibiotic therapy. The authors recommend colectomy as the best surgical treatment and

describe in detail a technique for a primary one-stage colectomy with ileostomy. This procedure in their opinion materially lessens the complications and difficulties often associated with multiple-stage operations. They advise excision of the rectum by means of an abdomino-perineal resection in all cases except the very rare instances in which there is no apparent rectal involvement. As regards vagotomy, the authors are not clear about the rationale of its use and consider that conclusions on its value cannot be drawn. In their series of 249 cases, 45 patients (18%) underwent some form of operation; the mortality rate was 4.6%. In 86.3% of cases in which colectomy was performed rehabilitation was successful.

#### Amnesia for Limbs.

K. E. FRANZ (*The Journal of Nervous and Mental Disease*, September, 1950) discusses amnesia for limbs and describes the case of a man whose amnesia for his left limb and loss of interest and attention in the left field of vision involved him in serious accidents. Autopsy revealed a neoplasm involving the thalamo-supramarginal fibres. The centre was on the border between the parietal and occipital lobes.

#### Carcinoma of the Prostate.

A. WESTERBORN (*Surgery, Gynecology and Obstetrics*, December, 1950) states that in Scandinavia perineal prostatectomy has been practically abandoned mainly on account of the high incidence of post-operative urinary incontinence and of recurrences. The patients are usually treated only palliatively with electroresection, hormone therapy and castration. Cysto-prostate-vesiculectomy is recommended for primary, localized, prostatic cancer; its operative mortality is 8% to 10%. The author reports two cases in which the operation was performed by the abdomino-perineal method after transplantation of the ureters to the bowel. It caused no undue strain on the patients, and the primary results were very encouraging. Both patients felt well twelve and eighteen months respectively after operation. The author recommends the operation as the method of choice in the treatment of localized cancer of the prostate in young and middle-aged "good-risk" patients. He considers that patients of advanced age or patients in poor general condition should be treated with electroresection and hormone therapy, possibly in combination with castration.

#### Aureomycin and "Chloromycetin" in Gas Gangrene.

W. A. ALTEMEIER, J. A. McMURRIN AND L. P. ALT (*Surgery*, October, 1950) state that "Chloromycetin" and aureomycin both possess pronounced antibacterial activity *in vitro* for highly virulent strains of *Clostridium welchii* isolated from war wounds complicated by gas gangrene. The antibacterial effect of aureomycin was approximately 25 to 500 times greater *in vitro* than that of "Chloromycetin" for the strains of *Clostridium welchii* tested. Both agents were found to be very effective in preventing the development of gas gangrene in wounds of experimental animals. Animals treated immediately after inoculation with bacteria did not develop gas gangrene if administration of either antibiotic

was discontinued after seventy-two hours. The effectiveness of both agents was diminished and limited in established *Clostridium welchii* infections. Parenterally administered "Chloromycetin" and aureomycin in average dosage appeared to be at least as effective as penicillin in massive doses for the prevention or treatment of severe experimental *Clostridium welchii* infections similar to those occurring in man.

W. R. SANDUSKY *et alii* (*ibidem*) state that the results of controlled studies with aureomycin indicate that this drug administered intramuscularly shortly after wound contamination protects guinea-pigs from death due to clostridial infection. A high mortality rate occurring from causes other than clostridial infection among animals receiving aureomycin was not adequately explained. The difference in survival rates between control animals and those receiving "Chloromycetin" shortly after wound contamination is of statistical significance and indicates that this drug is of value in protecting guinea-pigs against death from experimentally produced clostridial infection. Application of these results to the human clinical problem requires caution at present, but they suggest that the two antibiotics may prove valuable adjuncts in the treatment of gas gangrene.

#### Valvulotomy for Congenital Valvular Pulmonary Stenosis with Intact Ventricular Septum.

ALFRED BLALOCK AND RICHARD F. KIEFFER, JUNIOR (*Annals of Surgery*, September, 1950), report 19 cases of congenital valvular pulmonary stenosis with intact ventricular septum in which division of the stenosed pulmonary valve was performed by the method of Brock. The more important features of the history, the physical examination and the findings from electrocardiography, angiocardiology and catheterization are listed. The detail of the operative procedure, which is that described by Russell Brock, is given in detail. Special pulmonary valvulotomies and sounds devised by Brock are used, and the authors consider that the operation is not difficult technically. They state that the success of the operation depends on careful attention to detail from the beginning of the diagnostic stage until the patient has passed through the immediate post-operative period. There were two deaths in the 19 patients, one attributable to severe heart failure and one due to a preexisting abscess of the brain which became evident only after the operation. The remaining patients are improved, and some appear to be in normal health. Certain important problems present themselves in regard to this operation, some of which cannot be answered with assurance at the present time. One is the ultimate fate of the incised valve; the questions are asked whether there is any danger that the cut edges will heal together, and whether scar contraction will produce a reformation of a constriction. It is also asked if it is possible that the procedure may create an incompetent pulmonary valve which may eventually result in a serious degree of pulmonary insufficiency. However, the authors consider that valvular pulmonary stenosis is a mechanical disorder which can be diagnosed and treated by direct operative attack on the valve.

## British Medical Association News.

### ANNUAL MEETING.

THE annual meeting of the Tasmanian Branch of the British Medical Association was held at the Royal Society's rooms, the Museum, Hobart, on February 10, 1951, Dr. S. G. GIBSON, the President, in the chair.

The Assistant Editor of THE MEDICAL JOURNAL OF AUSTRALIA was present by invitation.

### MINUTES.

The minutes of the previous annual meeting, held on February 4, 1950, were read and confirmed.

### ANNUAL REPORT.

The annual report of the Council was read by the Secretary and adopted on the motion of the President, seconded by Dr. L. N. Gollan. The report is as follows.

The Council has pleasure in presenting the annual report of the work of the Branch for the year ended December 31, 1950.

### Membership.

The membership as at January 1, 1951, was 182, as compared with 169 at the beginning of 1950.

As per last report .. .. .	169
Elected during 1950 .. .. .	12
Re-elected .. .. .	1
Transfers from other branches .. ..	15
<b>Less—</b>	<b>197</b>
Transfers to other branches .. 14	
Deceased .. .. .	1
	<b>15</b>
	<b>182</b>

### Meetings.

**Council.**—Fourteen meetings of the Branch Council were held since the last report, and the attendance was as follows: Dr. T. G. Hogg 1, Dr. J. B. Hamilton 2, Dr. J. L. Grove 14, Dr. L. N. Gollan 9, Dr. C. Craig 9, Dr. T. Giblin 12, Dr. S. Gibson 13, Dr. G. M. W. Clemons 7, Dr. G. R. Beattie 5, Dr. F. R. Fay 14, Dr. B. Hiller 14, Dr. A. O. Green 8, Dr. J. B. Muir 12, Dr. C. Clarke 8, Dr. R. A. Lewis 3.

### Obituary.

The death of Dr. G. H. Hogg is recorded with regret. Dr. Hogg served the Association for many years on the Branch Council, of which he was three times President.

### General.

The meetings of the Branch Council in the first half of 1950 were largely occupied in considering various aspects of the National Health Scheme proposed by Sir Earle Page. Progress of the negotiations between the Federal Council and the Federal Minister for Health were reported to members from time to time at the divisional meetings by our two Federal representatives, Dr. T. Giblin and Dr. J. L. Grove, and also by Dr. J. G. Hunter at special divisional meetings held in March.

In the latter half of the year the *Pharmaceutical Benefits Act* came into force, and apart from some minor irregularities in the availability of certain drugs, it appears to be working well. It is a matter for considerable satisfaction that this Act incorporates most of the points recommended by the British Medical Association, including the use of the doctors' own prescription forms.

Recently various facets of the pensioner medical service have been discussed, and as members are aware, this is about to come into operation.

The Branch Council have appointed Dr. T. Giblin and Dr. J. B. G. Muir as your Federal Council representatives for 1951, Dr. Grove having resigned after many years of able service in this capacity. It is with sincere regret that we see him go.

In the annual report last year we reminded members that as a satisfactory agreement with friendly societies had been reached, we hoped that lodge medical officers would get copies of the agreement and have them signed. Now we have to report that the lodges have been very dilatory about signing their agreements, and a number of them are

introducing a new dual system of remuneration—part capitation and part fee-for-service—to which the Branch Council feels it cannot agree. Having received no satisfaction from correspondence with the offending lodges, the Council has recommended to members, through the Divisions, that consideration be given to terminating the present agreement and negotiating a new agreement on a fee-for-service basis.

The Branch Council is pleased to report that a deputation waited upon the Premier last month and placed before him the facts of the situation *re* non-payment of visiting out-patient staff at the public hospitals. The Premier stated that out-patient visiting medical staff would be paid on a sessional basis commencing in the next few weeks.

Conferences between the Minister for Health and representatives of the Branch Council were held in March, July, September and December and various items were discussed—namely, intermediate beds at public hospitals, school medical officers and school medical services, rates of pay for salaried government medical services, registration of alien doctors, dental anaesthetics, and payment to visiting staff at public hospitals.

With regard to the registration of alien doctors in Tasmania as proposed by the Minister of Health, the Branch Council considered the problem very fully both from the aspect of protecting the public and from that of maintaining our standards of medical practice. Certain recommendations were made to the Minister, with which he fully agreed, and details of these were reported in the Press. The bill is now being drafted, and it is hoped that the bill will be submitted to the Branch Council for comment (as was the *Tuberculosis Act* last year) before it becomes law.

The various subcommittees have been fairly active during the last twelve months. The Publicity Subcommittee made statements to the Press on the subjects of crash helmets for motor cyclists and the invidious position of out-patient staff at the Royal Hobart Hospital in regard to payment. The Workers' Compensation Subcommittee is still negotiating with the Chief Secretary to get the New South Wales schedule of fees incorporated in the local Act, and it is hoped that this will come about next month. A new subcommittee was formed to deal with any complaints by patients about medical fees.

In March Mr. Casey resigned from the position of lay secretary, and the Branch Council appointed Mr. R. A. Rowe in his place.

There have been nine issues of the official newsletter this year, by means of which members have been kept informed of all matters of interest.

S. GIBSON,  
President.

### FINANCIAL STATEMENT.

The income and expenditure account and the balance sheet for the year 1950 were presented by Dr. B. Hiller and were adopted on his motion, seconded by Dr. T. Giblin. The financial statements are published herewith.

### REPORTS OF DIVISIONS.

The annual reports of the Northern and Southern Divisions of the Branch were read by Dr. L. N. Gollan and Dr. R. A. Lewis respectively.

### ELECTION OF OFFICE-BEARERS.

The President formally declared the following members elected to the several offices: *President-Elect*, Dr. T. Giblin; *Vice-President*, Dr. C. Clarke; *Medical Secretary*, Dr. F. R. Fay; *Honorary Treasurer*, Dr. B. Hiller; *Members of Council*, Dr. C. Craig, Dr. D. Waterworth, Dr. A. Miller.

### APPOINTMENT OF AUDITORS.

Messrs. Adams and Bennetto were reappointed auditors for the ensuing twelve months.

### INSTALLATION OF PRESIDENT.

Dr. S. G. Gibson then vacated the chair and installed Dr. G. W. Clemons as President for the ensuing twelve months. He thanked the members of the old Council for their support during his term of office.

Dr. G. W. Clemons, on taking the chair, thanked the members for his election.

### RETIRING PRESIDENT'S ADDRESS.

Dr. S. G. Gibson then read his retiring president's address (see page 605). At the conclusion of the address a vote of thanks to Dr. Gibson was carried by acclamation.

## BRITISH MEDICAL ASSOCIATION.

## TASMANIAN BRANCH.

## Headquarters Fund Account.

	£	s.	d.		£	s.	d.
To Balance, January 1, 1950 .. .. .	203	14	9	By Balance, December 31, 1950 .. .	207	11	4
" Bank Interest .. .. .	3	16	7				
	£207	11	4		£207	11	4

## Balance Sheet as at December 31, 1950.

LIABILITIES.				ASSETS.			
	£	s.	d.		£	s.	d.
Headquarters Fund Account .. ..			207 11 4	English, Scottish and Australian Bank .. .	275	19	9
Capital Account—				Hobart Savings Bank (Headquarters Account) ..	207	11	4
Balance, 1949 .. .. .	1,547	13	8	Commonwealth Treasury Bonds .. .	860	0	0
Australasian Medical Publishing Company, Limited—Debentures issued .. .	63	7	6	Australasian Medical Publishing Company, Limited—Debentures .. .	308	11	3
	1,611	1	2	War Savings Certificates .. .	133	0	0
Less Deficiency, 1950 .. .. .	6	13	2	Furniture .. .. .	£20	0	0
			1,604 8 0	Cupboard .. .. .	£10	0	0
Creditors—Audit Fees, 1949 .. ..			3 3 0				
			£1,815 2 4				

## Income and Expenditure Account.

EXPENDITURE.				INCOME.			
	£	s.	d.		£	s.	d.
To Secretary's Salary .. .. .			260 0 0	By Members' Subscriptions .. .. .			1,261 10 0
" Printing, Stationery, Typing and Duplicating (including Newsletters) .. .	79	5	0	" Interest—			
Less collected .. .. .	2	16	3	Debentures .. .. .	10	11	7
			76 8 9	Commonwealth Loans .. .. .	27	11	6
" Postage, Duty Stamps, Telephone and Telegrams .. .	77	15	10				38 3 1
Less collected .. .. .	6	13	6	" Sale of Lodge Agreements .. .. .	1	3	6
			71 2 4	" Sale of List of Members .. .. .			7 6
" Aerial Insurance .. .. .	113	7	0	" Refund, Advertising .. .. .	24	15	0
Less collected .. .. .	51	0	0	Less Paid .. .. .	8	15	8
			62 7 0				15 19 4
" Rent of Room .. .. .			17 6	" Excess of Expenditure over Income ..			6 13 2
" Travelling Expenses—							
Branch Council .. .. .	184	13	6				
Secretary .. .. .	18	17	0				
			203 10 6				
" Capitation Fees—							
Federal Council .. .. .	176	8	0				
Australasian Medical Publishing Company, Limited ..	169	0	0				
British Medical Association, London .. .. .	210	7	6				
Southern Division .. .. .	49	10	0				
Northern Division .. .. .	35	10	0				
			640 15 6				
" Not Paid—							
Audit Fee .. .. .			3 3 0				
Code Address Fee .. .. .			2 2 0				
Bank Charges .. .. .	3	13	3				
Less collected .. .. .			3 3				
			3 10 0				
			£1,323 16 7				£1,323 16 7

Audited and found correct.

(Signed) ADAMS AND BENNETTO,  
Chartered Accountants (Aust.).

## Correspondence.

## A REVIEW OF SHARK ATTACKS IN AUSTRALIAN WATERS SINCE 1919.

SIR: The power of digestion of the shark is a favourite subject for anthropomorphic thinking, and it is popularly supposed that digestion in sharks is extremely rapid. This is not only not entirely in accordance with fact, but there is ample evidence to indicate that both the anatomy of the digestive tract and the processes of digestion in sharks and fishes are essentially different from that of man and mammals. The teeth of most sharks are purely incisive. They

have no power of mastication, and food is swallowed whole. Sharks' stomachs are U-shaped and two sections can be differentiated. The proximal section (*portio cardiaca* or *descendens*) is an extensive bulky compartment in which food is often heaped up in large quantities. There is ample evidence to suggest that in this compartment of the stomach the shark is able to store considerable quantities of undigested food for long periods. The other (*portio pylorica* or *ascendens*) is a narrow compartment which leads through a well-defined pylorus into the bowel. Here it is probable rapid digestion takes place. The stomach is approximately the same length as the bowel, and the whole of the digestive tract apart from the bend in the stomach runs without curves the length of the abdominal cavity. This arrangement is markedly different from that found in man and most mammals, in whom the bowel is several



times the length of the body. The shortness of bowel in the shark is compensated for by the spiral valve present in the intestine.

During my absence for several months abroad, Dr. V. J. Kinsella wrote to you (THE MEDICAL JOURNAL OF AUSTRALIA, December 9, 1950) concerning the paper "Shark Attacks in Australian Waters" (THE MEDICAL JOURNAL OF AUSTRALIA, November 4, 1950). He commented that it was strange that in the investigation of digestion in the shark's stomach the well-established methods of studying gastric digestion in man had been neglected, and suggested that, at least, fractional test meals with estimation of acid and ferment secretion should have been carried out. Dr. H. Flecker, in your issue of February 19, 1951, pointed out that, on the contrary, there has been considerable scientific investigation and set out in some detail a list of references.

Fractional test meals on live sharks are by no means easy to undertake. As long ago as 1901 Dr. Ernst Weinland, at the physiological section of the zoological station in Naples, devised a satisfactory method. He found that it was possible to pass a glass tube through the mouth straight into the stomach of the living animal (taken out of the water and placed on its back) as often as he liked, and in this way to withdraw directly samples of the contents of the stomach or to empty the stomach. If the procedure was at all prolonged, artificial respiration was carried out with sea water. The tube could be passed daily for several months in some sharks.

Many other attempts have been made to obtain in this way accurate and direct evidence of the nature of the gastric juice both of sharks and other fishes. The findings of the scientific observers, however, are not very definite, and my statement, to which Dr. Flecker refers, that "the gastric juice of sharks contains little if any hydrochloric acid" was based on Weinland's findings that "if any free hydrochloric acid at all is contained in the gastric juices of sharks, such free hydrochloric acid is in very small quantity in comparison to the other free acids".

Weinland also found that food remained a long time in the stomach of sharks and that it was only gradually liquefied. In one case, remains of a squid were detected in the stomach of a shark eighteen days after ingestion; in another, remains were present of crabs which had been introduced eleven days before. The shark used in both instances was the *Scyllium stellare* or cat shark. Numerous experiments were carried out in sharks and rays, and the same results were found whether the food was introduced into the stomach or whether the shark ate it spontaneously. This long sojourn of food in the stomach of sharks has been amply corroborated from other sources and by other workers. The stomach of a fourteen foot tiger shark which recently died after it had been placed in the aquarium at Taronga Park was found to contain two young porpoises three feet long, which were quite undigested. They were swallowed by the shark before capture and had been present in its stomach for at least eleven days. There are also many similar records of human remains being recovered from the stomachs of sharks after long periods. The following are recent instances.

On January 10, 1949, an eight foot shark, said to be a tiger shark, was caught off Leighton Beach, Perth, Western Australia, and found to contain the hand of a man who had been drowned on December 27, 1948.

On July 6, 1949, a young woman was bathing at Broome, Western Australia, when her left arm was taken off by a shark. The shark, which has been positively identified by Mr. Gilbert Whitley, ichthyologist of the Australian Museum, as a whaler shark (*Galeolamna*), was caught five days later and found to contain the arm with the young woman's ring on a finger inside its stomach.

A four foot six inch shark said to be a tiger shark was caught off Safety Bay, Western Australia, on March 9, 1950. When opened it was found to contain a partly decomposed human arm. This was from a man who was last seen alive on February 26 and whose body minus the hand had been washed up on March 1.

From the medico-legal aspect the so-called "shark arm" case presented a most interesting problem involving this question of digestion in the stomach of sharks. I first became associated with the case about May, 1935, when Dr. Arthur Palmer, the Government Medical Officer for New South Wales, asked me to call at the morgue to see an arm which had been vomited by a shark at the Coogee aquarium. Examination of the arm showed that it had not been bitten off by a shark, but that it had been amputated by a knife at the shoulder joint and later swallowed by the shark. The nature of the division of the tissues, the clean dissection of the shoulder joint and the absence of any portion

of the overhanging acromion ruled out any possibility of shark bite. The arm was in a good state of preservation. The only sign of digestion was limited to the upper third of the arm and was very superficial. There was an oblique straight incised wound above the elbow on the antero-lateral side of the upper arm. There was a tattoo on the forearm and a piece of rope around the wrist. There can be no question that the arm remained at least ten days in the shark's stomach from April 18 to April 27. The maximum period which it could have been present was twenty days. The dates are as follows: April 8: James Smith, the murdered man, last seen alive at Cronulla. April 18: Shark caught and put on exhibition at Coogee aquarium. April 27, 4.30 p.m.: Shark vomited a bird, a rat, a lot of slime and a human arm, which was later proved by a tattoo and finger prints to be that of James Smith.

It has also been found that sharks can be starved for long periods, and Minko Dobreff (*Arch. ges. Physiol.*, Berlin, 217, 1927, pp. 221-234) states that "sharks can live for a very long time whilst deprived of formed food". (One *Scyllium* lived up to 112 days.)

For a number of years, two grey nurse sharks, Skipper IV and Skipper V, were kept in captivity at the aquarium at Taronga Park, Sydney. The records of their feeding habits are of considerable interest and show that they took very small quantities of food during the winter months. I am indebted to Colonel Spain and the Taronga Zoological Park Trust for the following information:

Skipper IV was received in November, 1933, and measures 10' 6" to 11'. Weight approximately 336 lbs. Skipper V is about 9' in length and was received in October, 1936. These two grey nurse sharks ate the following amounts of fish in the different months shown for the twelve months ending January, 1939: a mixed diet comprising king fish, mullet, jew fish, a few morwong, salmon, trevally, sea mullet, tailor and bonito. The diet was fairly well spread over the different fish enumerated and the sharks did not take to any species in particular.

	Skipper IV.	Skipper V.
	Lbs. of Fish.	
1938—February .. .. .	48	4
March .. .. .	18	15
April .. .. .	18	24
May .. .. .	3	7
June .. .. .	5	4
July .. .. .	9	0
August .. .. .	4	4
September .. .. .	32	8
October .. .. .	20	10
November .. .. .	7	40
December .. .. .	10	49
1939—January .. .. .	4	35
	178	200

As the chart shows very little is eaten in the months of May, June, July and August. . . .

Whilst much has yet to be learnt about the digestion of sharks, there can be little doubt that they have the power of storing food for long periods in the proximal part of their stomach. Before there can be any proper understanding of test meals, more is required to be known about the functions and histology of the two compartments of the shark's stomach and the rate of progress of food through each of them—information which could probably best be obtained by an ichthyological counterpart of a barium meal or possibly by more modern methods with an isotope-injected fish and a Geiger counter.

In regard to the main thesis of my paper, that shark attacks tend to occur in groups within relatively short periods of time in the same locality, two further attacks in Queensland and information received concerning attacks around the South African coast are further evidence in its support.

The details of the Queensland attacks are that on November 25, 1950, a lifesaver was badly bitten by a shark at Burleigh Heads, near Brisbane; about three weeks later on December 16, 1950, another lifesaver was fatally mauled by a shark at Palm Beach, Queensland—about four or five miles away.

For the details of the South African attacks, I am indebted to Mr. N. C. Gracie, honorary general secretary of the Surf Life Saving Association of South Africa, who writes as follows:

There have been 15 shark attacks on the Durban beaches in the last six years. There have, of course, been about a half-dozen other attacks during this

period at south coast beaches. The latest attack was on an aboriginal native who was attacked on Sunday, 21st of January, at 4.30 p.m. He was swimming at a point of clear demarcation between the dirty water and the blue water. There have been very few attacks on non-Europeans, but the shark that attacked him must have been very large because it wrenched or tore his right leg out of the socket and he died from shock and hæmorrhage before reaching hospital. The Umgeni river which flows into the sea just north of Durban usually brings down a lot of silt shortly after any rains inland and sharks are attracted in their dozens to the mouth of the river. The tide brings all this brown or dirty water down in front of and through the Durban bathing beaches.

#### Shark Attacks.

1944—January 5	South Beach
January 20	North Beach
March 15	Country Club
March 27	North Beach
1946—January 25	Snake Park
February 11	Battery
February 16	South Beach
1947—January 6	Country Club
March 10	Country Club
March 12	Country Club
April 11	Umgeni Mouth
April 21	Country Club
1950—February 11	Addington
March 10	Country Club
1951—January 21	Native Beach (Native)

Although further information is being sought concerning the actual distances separating these beaches, the grouping of attacks at North Beach in 1944 and at Country Club Beach in 1947 is apparent.

Yours, etc.,

V. M. COPPLESON.

225 Macquarie Street,  
Sydney,  
April 17, 1951.

## Post-Graduate Work.

### THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

#### Overseas Lecturers.

##### Professor Matthew J. Stewart.

The Post-Graduate Committee in Medicine in the University of Sydney announces that arrangements have been made for Professor Matthew J. Stewart, F.R.C.P., who has recently retired from the Chair of Pathology, University of Leeds, Yorkshire, England, to give the following lectures at 8.30 p.m. in the Stawell Hall, 145 Macquarie Street, Sydney: Thursday, May 10, "Peptic Ulcer, with Special Reference to Ulcer Cancer"; Tuesday, May 22, "Pneumokonioses". Fee for attendance at both lectures will be 10s. 6d. or 7s. 6d. for a single lecture. Admission tickets may be obtained on application to the Course Secretary, the Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 5238, BW 7483.

##### Professor B. W. Windeyer and Dr. M. H. Jupe.

The Post-Graduate Committee in Medicine has made arrangements for the visiting examiners for the F.F.R. examination, Professor B. W. Windeyer, F.R.C.S., F.F.R., D.M.R.E., Professor of Radiology, University of London, and Dr. M. H. Jupe, B.A., F.R.C.S., F.F.R., D.M.R.E., Director of the Radiodiagnostic Department, London Hospital, to give the following lectures on Thursday, May 17, 1951, at 8.15 p.m., in the Stawell Hall, 145 Macquarie Street, Sydney: "The Place of Radiotherapy in the Treatment of Malignant Disease", Professor B. W. Windeyer; "The Influence of Diagnostic Radiology in Medicine", Dr. M. H. Jupe. All medical practitioners are invited to attend without fee.

#### DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MARCH 31, 1951.<sup>1</sup>

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory. <sup>2</sup>	Australian Capital Territory.	Australia. <sup>3</sup>
Ankylostomiasis	..	..	1	..	2	..	..	..	3
Anthrax	..	..	..	..	..	..	..	..	..
Beriberi	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Cerebro-spinal Meningitis	..	..	1	..	..	3(3)	..	..	4
Cholera	..	..	..	..	..	..	..	..	..
Coastal Fever(a)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile)	..	..	1(1)	..	3(2)	4	..	..	8
Diphtheria	5(2)	7(4)	6(5)	..	11(7)	..	..	..	20
Dysentery (Amoebic)	..	5(3)	1(1)	..	1	..	..	..	1
Dysentery (Bacillary)	..	3(2)	..	..	..	..	..	2	8
Encephalitis Lethargica	..	..	..	..	..	..	..	..	3
Erysipelas	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Helminthiasis	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Influenza	..	..	..	..	..	..	..	..	..
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Malaria(b)	..	..	..	..	..	..	..	..	..
Measles	..	..	..	34(1)	..	..	..	..	34
Plague	..	..	..	..	..	..	..	..	..
Polio-myelitis	62(29)	12(6)	51(13)	32(23)	..	7(2)	..	7	171
Psittacosis	..	..	..	..	..	..	..	..	..
Puerperal Fever	..	..	1	..	..	..	..	..	..
Rubella(c)	..	..	1	..	3(3)	..	..	..	4
Scarlet Fever	19(10)	30(15)	1	3(1)	4(3)	4(1)	..	2	63
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	1	1(1)	..	..	..	..	..	2
Trachoma	..	..	..	..	..	..	..	..	..
Tuberculosis(d)	19(13)	46(35)	5(3)	6(5)	4(2)	7(2)	..	..	87
Typhoid Fever(e)	1	..	1	..	4(4)	..	..	..	6
Typhus (Endemic)(f)	..	..	2	..	..	..	..	..	2
Undulant Fever	..	..	..	..	..	..	..	..	..
Weill's Disease(g)	..	..	..	..	..	..	..	..	..
Whooping Cough	..	..	..	3	..	..	..	..	3
Yellow Fever	..	..	..	..	..	..	..	..	..

<sup>1</sup> The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 37, 1946-1947. Figures in parentheses are those for the metropolitan area.

<sup>2</sup> Figures not available.

<sup>3</sup> Figures incomplete owing to absence of returns from the Northern Territory.

<sup>4</sup> Not notifiable.

(a) Includes Mossman and Sarina fevers. (b) Mainly relapses among servicemen infected overseas. (c) Notifiable disease in Queensland in females aged over fourteen years. (d) Includes all forms. (e) Includes enteric fever, paratyphoid fevers and other *Salmonella* infections. (f) Includes scrub, murine and tick typhus. (g) Includes leptospirosis, Weill's and para-Weill's disease.

### Course for the Diploma in Anaesthesia.

The Post-Graduate Committee in Medicine in the University of Sydney announces that it is proposed to begin a course for candidates for the diploma in anaesthesia in Sydney on June 18, 1951, for a period of five months. Those intending to undertake this course are asked to note that the closing date for applications is June 1, 1951. Further details may be obtained on application to the Course Secretary, the Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 5238, BW 7483.

### Course for the Diploma in Clinical Pathology.

It is proposed to begin the course for the diploma in clinical pathology in Sydney on July 9, 1951, for a period of six months. Intending applicants are requested to enrol with the Course Secretary of the Committee, 131 Macquarie Street, Sydney, not later than June 22, 1951.

## Australian Medical Board Proceedings.

### NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act, 1938-1945*, of New South Wales, as duly qualified medical practitioners:

- Batt, Betty Joan, M.B., B.Chir., 1948 (Univ. Cambridge), 92 Donnelly Street, Armidale.  
 Batt, Eric Harrison, M.B., Ch.B., 1946 (Univ. Leeds), 92 Donnelly Street, Armidale.  
 Donaldson, James Blair, L.R.C.P. (Edinburgh), L.R.C.S. (Edinburgh), L.R.F.P.S. (Glasgow), 1913, c.o. Dr. D. Thomson, Pambula.  
 Gregory, Geoffrey Collen, M.B., B.S., 1950 (Univ. Melbourne), District Hospital, Broken Hill.  
 Margolis, Joel, M.B., B.S., 1948 (Univ. Melbourne), Royal Alexandra Hospital for Children, Camperdown.  
 Wilkinson, William Hartley, M.B., B.S., 1945 (Univ. Melbourne), 52 West Parade, West Ryde.

The following additional qualifications have been registered:

- Curtin, Bryan Austin David, 201 Macquarie Street, Sydney (M.B., B.S., 1942, Univ. Sydney), M.R.A.C.P., 1947, M.R.C.P. (London), 1950, D.C.H. (R.C.P. and S.), 1950.  
 Henchman, David Crosborough, 141 Victoria Road, Bellevue Hill, Sydney (M.B., B.S., 1943, Univ. Sydney), D.C.H. (R.C.P. and S.), 1949.

### TASMANIA.

THE undermentioned has been registered, pursuant to the provisions of the *Medical Act, 1918*, of Tasmania, as a duly qualified medical practitioner:

- Macqueen, Donald, M.B., Ch.B., 1918 (Univ. Glasgow), Whitemark, Flinders Island.

## Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

- Armstrong, John Beresford, M.B., B.S., 1947 (Univ. Sydney), 5 Oswin Street, Parkes, New South Wales.  
 Boughton, Clement Russell, M.B., B.S., 1950 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards, New South Wales.  
 Atkinson, Kenneth John James, M.B., B.S., 1951 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 Knox, Eleanor Charis, M.B., B.S., 1951 (Univ. Sydney), Rachel Forster Hospital for Women and Children, Redfern.

The undermentioned have been elected as members of the South Australian Branch of the British Medical Association:

- Dunstan, Richard English, M.B., B.S., 1950 (Univ. Adelaide), 123 Edward Street, Norwood.  
 Flett, John Stanley, M.B., B.S., B.Sc., 1950 (Univ. Adelaide), 4 Moten Avenue, Graymore.

- Harley, James Fromas, M.B., B.S., 1950 (Univ. Adelaide), 26 Marlborough Street, College Park.  
 Holmes, Reginald Murray, M.B., B.S., 1949 (Univ. Adelaide), Wien-Smith Building, Clare.  
 Roberts, Joseph Armistice, M.B., B.S., 1950 (Univ. Adelaide), 4 Price Crescent, Lower Mitcham.  
 Stewart, Alastair Keith McKellar, M.B., B.S., 1950 (Univ. Adelaide), 52 First Avenue, St. Peters.  
 Sweeney, John Gladstone, M.B., B.S., 1950 (Univ. Adelaide), 54 Barton Terrace, North Adelaide.

## Diary for the Month.

- MAY 1.—New South Wales Branch, B.M.A.: Organization and Science Committee.  
 MAY 2.—Victorian Branch, B.M.A.: Branch Meeting.  
 MAY 2.—Western Australian Branch, B.M.A.: Council Meeting.  
 MAY 3.—South Australian Branch, B.M.A.: Council Meeting.  
 MAY 4.—Queensland Branch, B.M.A.: Branch Meeting.  
 MAY 4.—Tasmanian Branch, B.M.A.: Council Meeting.  
 MAY 8.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

**New South Wales Branch** (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

**Victorian Branch** (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

**Queensland Branch** (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

**South Australian Branch** (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

**Western Australian Branch** (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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